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John A. Navin C. S.

NAVIN'S
VETERINARY PRACTICE:

OR

Explanatory Horse Doctor.

WRITTEN IN PLAIN AND COMMON LANGUAGE,

FOR THE USE OF THE FARMER, BREEDER, OR OWNER OF THE HORSE.
TO ENABLE HIM TO TREAT CORRECTLY AND SUCCESSFULLY
ALL THE DISEASES TO WHICH THE HORSE IS LIABLE.

COPIOUSLY ILLUSTRATED BY CUTS AND ENGRAVINGS.

BY

JOHN NICHOLSON NAVIN,
VETERINARY SURGEON.

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TYPESET AT THE
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PREFACE.

IN preparing this work, the author has kept constantly in view that it is intended for the use of the farmer, and not for the professional horse doctor or veterinary surgeon. Its object is to enable the owner of the horse to give him that intelligent attention his worth and nobility deserve.

The author has been for several years collecting and arranging the facts necessary to the preparation of the work. He has carefully observed the symptoms of the cases of each disease that has come under his observation, and the effect of the remedies given. By this course it is believed nearly every thing contained in the work, whether relating to the nature and symptoms of disease or to the treatment, has been subjected to the unerring test of practical experience.

The author has generally avoided theorizing, and relied on the statement of known facts, believing that these will deceive nobody, while theories, however plausible, are worth nothing, if not supported by experience.

Nor has the author relied alone on his education in the profession of veterinary medicine, but he has consulted freely and critically the works of all the more distinguished European authors, as Blaine, Percival, White, Mayhew, Youatt, etc.; also, the works of Doctor Dadd, of the United States, especially his "Anatomy and Physiology of the Horse." All these works, though written for the professional horse doctor, have been of service to the author in preparing this work for the people.

Such are the resources from which the material of this work have been

gathered. Their collection and arrangement in a book, so written as to be perfectly understood by the man of common education, has been a work of years, having occupied the author's entire attention for over three years.

In addition to this, every part of this work has passed under the careful and critical examination of my friend D. Adams, M. D., whose high attainments as a scholar and physician, whose accurate knowledge of human anatomy, and also the anatomy of inferior animals, and whose zeal in behalf of the noble animal, the horse, for whose benefit the work is intended, have peculiarly adapted him for pointing out any defects, either in plan or matter, which might have crept into the work.

It is believed that the work is now ready to be placed before the public, as perfect, in all its parts, as it is possible to get it in the present state of our knowledge of the nature and treatment of the diseases of the horse.

The arrangement of the work is that which would seem most natural. Those subjects are first treated which are of the greatest importance. The work is arranged in four divisions, each division perfect in itself as to the subject of which it treats.

Division First treats of the diseases of the horse, giving a description of each particular disease, its nature, symptoms, mode of distinguishing, and treatment. The treatment given is the best known, and such as may be readily obtained.

Division Second treats of breeding, raising, and management of the horse. The instructions given in this part of the work will enable the farmer to secure the most perfect and healthy stock of horses, and render the necessity for medicines very small.

Division Third treats of the anatomy and physiology of the horse, giving such descriptions of the various parts of his system, and their actions and uses, as will enable any one to obtain a good knowledge of

the subject. It teaches the proper form and shape of the various parts to render the horse most useful for any particular purpose. This knowledge is necessary to a good judgment of the qualities of the horse.

Division Fourth treats of the various medicines, instruments, and apparatuses used in treating the diseases and injuries of the horse. The instruments and apparatuses are carefully described and their uses explained. The uses, properties, the size of the dose, the effect produced by, the mode of giving each medicine, and the diseases in which it is used, are clearly explained. This part of the work also contains a great variety of reliable recipes and cures, and a variety of other miscellaneous matter, and tables of weights and measures.

A dictionary, explaining many words used by authors in treating of the horse, and a full and complete index of every important point in the book, complete the work.



AUTHOR'S ADDRESS TO THE PUBLIC.

AT a time when the attention of the people is almost daily called to new books, the author of one bearing the title of this may reasonably be expected to show why such a work is necessary, and wherein it may prove of sufficient benefit to entitle it to a place in the library of every person interested in horses. A few facts will show the necessity for such a book as this claims to be, in the preface. In the United States there are but few educated horse doctors, or veterinary surgeons—not one to be found in many of our largest cities, or even in an entire State. Many years will pass before men educated for the business of doctoring horses, and following it as a profession, will become sufficiently numerous to be within the reach of every neighborhood. Now, the diseases of the horse are very numerous, and present a great variety of symptoms; so much so, that a case seldom occurs on which all the bystanders who profess some knowledge are agreed. And, I may add, the horse is often treated for the wrong disease, amid this confusion of opinion, and not unfrequently loses his life by such treatment. Now, in the absence of men educated as horse doctors, on whose judgment we may rely, is it not our only safe way of guarding against fatal mistakes, to have at hand a book written in plain language, which explains carefully every symptom of every disease, and points out especially those symptoms which distinguish each disease from every other for which it is liable to be mistaken?—and, not only so, but which tells what to give, the quantity to give at a dose, how to give it, what effect it will have, when to give more, and when to

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quit giving it? With such a book at hand, the farmer, or his neighbor, who may be more apt at doctoring horses, may determine the disease and apply the proper treatment with success, far superior to what would result without such a book. But has such a book yet been offered to the public? I think not. I am aware of a few works which are occasionally met with, which have given the subject a full consideration; but they are written in professional language, and, consequently, can not be understood by the general reader. Such are the works of Youatt, Dadd, and others. They are not at all explanatory. Besides these, there are many small works on farriery, generally in pamphlet form, principally filled up with "cures," "receipts," etc. These are usually written by farriers or shoeing smiths, who have been industrious in gathering up cures. Whatever may be the merits of the cures they contain, they are so deficient in the explanation of the symptoms of the different diseases as not to be relied on. Certainly, if any are disposed to use their own cure, or that of the farrier, for any disease, the first point is to determine that the horse has that disease.

From these facts, it is clear that the books heretofore published do not contain all that is necessary in a horse-doctor book intended for the general use of the people. This, we think, does meet that object. It is so full in its explanations as to enable any one to understand it, and may be used to aid in explaining other works. It is especially valuable to those who have a collection of receipts, for it enables them to first determine the disease with certainty, so that they may not give their remedies in the wrong disease, and thus do harm instead of good with them.

That horses need doctoring is evident from the number of diseases to which they are liable, and the readiness with which they can be cured by proper treatment. The good effects of proper treatment of the diseases of horses are quite as clear as of those of human patients, and the evil of bad treatment quite as destructive of life. Some may object that,

if proper attention is given to breeding, raising, feeding, and the general management of the horse, he will seldom have disease. I admit this fact; and hence the second part of this work is chiefly occupied with the explanation of these subjects, and the importance of observing them. A healthy horse has every advantage over a sickly one, but even a sickly one is often better than no horse at all, and may abundantly repay the trouble and expense of doctoring him.

In former times in this country, when the price of horses was only about one-third the present value, it was not of so much consequence to guard against so small a loss as the price of a horse. In those times, if educated veterinary surgeons had been plenty, they would seldom have been called on, for the owner would generally have preferred letting his horse stand the chances of nature—or, what is worse, the ignorant pretender—to paying the horse doctor five or ten dollars for doctoring him. At this day it is quite different; but few men will hesitate paying a good veterinary surgeon such fees in any severe case of disease, if such a one is in reach. A horse is too valuable to be jeopardized by trusting him to an ignorant pretender, or even the better chances of undisturbed nature.

If veterinary surgeons were plenty, they would find employment enough even at their present high fees. But they are few and far between. The men who do pretend to know something about the diseases of horses, in most neighborhoods, have had to gather up their limited knowledge mainly from their own experience. They have not even had the advantage of books which give full descriptions and treatment of the diseases of the horse. Such books as might be relied on have been, unfortunately, written so as not to be understood by the man of common education; and the small pamphlets which are met are seldom of any service in enabling one to determine the disease. They pay but little attention to symptoms; and the treatment of many of them is positively injurious.

If any person is disposed to prepare himself for a regular horse doctor, in the absence of a regular college, he can have no better means of doing so than by the careful study of this work. It is the very best text-book for the veterinary surgeon. After studying it, the reader will be able to take up the works of Youatt, Percival, Dadd, and others who have written books for the profession, and read them with profit. This book furnishes a key or explanation of such works. Its dictionary explains the words found in those books, which so often cover up their meaning. It renders the road to the study of veterinary practice simple and easy; so that, by its lights and guides, the man of common education and common sense may become a first-rate veterinary surgeon, or thoroughly informed horse doctor.

NAVIN ON THE HORSE.

SIGNS OF DISEASE IN THE HORSE.

THE horse being unable to describe to us his feelings, and tell us the seat of his pain, we are compelled to rely on such signs and symptoms as we can discover, by various means, to determine the nature of his ailments. A few of the more common symptoms, or signs of disease, will now be considered. But to determine exactly the character of any particular case of disease, the combination of symptoms present will have to be considered. In this article, however, important landmarks are presented, which may be very useful in guiding to correct conclusions.

The Pulse.—The pulse of a medium-sized healthy horse beats about forty per minute. The pulse of a small horse may be a few more, or, of a larger one, a beat or two less. Age decreases the pulse slightly. Any considerable increase of the pulse over forty per minute indicates fever or inflammation, and other symptoms must be looked for to determine the particular locality of the disease. When great weakness ensues, the pulse becomes fluttering.

The Membrane of the Nose.—This, in health, is of a light pink color. In fever and inflammation it is red. If of the lungs or air-passages, it is more deeply colored, and specked with brown mucus. In the very last stage of most diseases, when death is about taking place, the membrane of the nose becomes of a dark, leaden or livid color. In glanders it is of a light blue and reddish color, with specks of ulceration over it. In scarlet fever it is covered with scarlet spots.

The Ears, in disease, lose their erectness and quickness of motion, and become dull, loose and fallen; falling forward if the head is down, and backward if it is raised, in all diseases affecting the system generally. The ears are cold in inflammation of the lungs and pleurisy. Slightly so in other diseases, as colic, etc.

The Eyes.—Weeping of the eyes is observed in colds, strangles, catarrhal fever, and glanders. When the eyes become glassy in the advanced stage of disease, it indicates that death is about to take place.

The Mouth is hot in fevers and inflammations. The mouth and tongue are clammy and offensive in severe fevers.

The Breathing.—The breathing is rapid in fevers; laborious in inflammation of the lungs; laborious, short, and catching in pleurisy, and difficult in thick-wind. The nostrils are much spread in inflammation of the lungs and pleurisy. The breath is hot. Deep, snoring breathing indicates disease of the brain.

The Feet.—Coldness of the feet indicates inflammation of important internal organs, as the lungs, pleura, bowels, bladder, etc. Heat and tenderness of the feet occur in founder.

The Hair.—The hair is dry and staring in farcy, glanders, indigestion, hide-bound from any cause, worms, mange, consumption, surfeit, all diseases of the skin, and starvation. The hair comes out in patches in mange, and in spots in surfeit.

The Skin.—Heat of the skin is one of the principal signs of external local inflammation; it also shows the presence of some fevers of a general character. A yellowness about the mouth, eyes, and nose, shows jaundice or inflammation of the liver. Redness of the skin of the heels is a forerunner of grease or scratches. Dryness and huskiness of the skin and hair indicate constitutional derangement, either of a chronic character, or, it may be, some acute disease already present, or just coming on, as pleurisy or inflammation of the lungs, in which the skin of the legs is cool or cold throughout.

The Dung.—The appearance of the horse's dung shows the

condition of his digestion. The dung very offensive, like that of the hog or human, indicates a want of action in the absorbent vessels of the bowels, which is a form of indigestion. The dung-balls are slimy in glanders, farcy, and worms.

The Water.—The urine of the horse undergoes very great changes of quantity, color, and thickness, when the animal is in perfect health. Stopping of the urine, or, when it passes only a little at a time, and that attended with great straining, indicates stricture, inflammation of the kidneys or bladder, or stone in the bladder. Diabetes is told by the composition of the urine and the quantity; bloody water by its being mixed with blood.

The Flanks heave in inflammation of lungs, pleura, and bowels. They are tucked up in glanders, farcy, indigestion, jaundice, and other diseases in which digestion is impaired. A kernel will be felt in the inside of the loose skin of the flank, in the groin, in mange. The flanks throb in thumps.

Drooping of the Head is a sign present in a great variety of diseases and of opposite characters. When it is observed, other symptoms should be looked for. It is most marked and perfect in diseases of the brain.

Lying Down.—In flatulent colic the horse lies down carefully, rolls, and tries to keep on his back. He then gets up quick. In spasmodic colic he lies down quick, rolls over quickly several times, and gets up, or he may only rise on his hips and sit for awhile, and then roll again, or get up. In inflammation of the bowels he lies down carefully, and lies stretched out, and paws or strikes with his fore-feet.

Standing Still.—In locked-jaw the horse stands wide, and fixed as a statue. In inflammation of the lungs he stands with the head inclining and his fore-feet forward, and does not want to move; and if he lies down, he gets up instantly. In pleurisy the same way, but may lie down for a little time.

Pointing with the Nose.—The horse points with his nose to the flanks, in inflammation of the bowels and colic; and turns his neck carefully and looks at his side, but does not put his nose

to the body, in pleurisy. In inflammation of the foot or acute founder he points his nose to the feet.

Pointing the Fore-foot indicates atrophy of the muscles of the shoulder, called sweeny. Pointing first one and then the other, is a symptom of chest-founder, or rheumatism. Dragging the fore-foot shows dislocation of the shoulder-joint.

Staggering in most diseases, as colic for example, indicates approaching death. It is a symptom of hysteries, palsy, and poisoning with narcotics.

Straddling, is a symptom of inflammation of the kidneys, bladder, and strain of the back.

Stiffness in Walking occurs in big-head, farcy, founder, lung fever, pleurisy, hysteries, and rheumatism.

Twitching of the skin on the side occurs in pleurisy.

Delirium occurs in inflammation of the brain, vertigo, apoplexy and stomach staggers.

Drying up of the Perspiration, or sweat, very suddenly, when the horse is being driven or worked, is an indication that he is about taking pleurisy or inflammation of the lungs, or some other severe form of inflammation.

INFLAMMATORY DISEASES.

INFLAMMATION OF THE BRAIN—MAD STAGGERS.

THIS disease is known by the names above, and sometimes also called brain fever. But I prefer the name of inflammation of the brain, from the fact that it indicates the nature of the disease.

Symptoms.—The early symptoms of inflammation of the brain much resemble those of the same stage of stomach, or sleepy staggers; dullness, or stupor; but there will not be that greedy disposition to eat, on being aroused, that there is in true stag-

gers. This is the only stage of the disease at which treatment can be made to do much good, as the violence of the animal's motions becomes so great in the second stage that it is very dangerous to attempt to handle him.

After the stupor goes off, the horse commences to show signs of pain; his nostrils expand; breathing becomes more rapid; his eyes, which were before heavy and closed, now open, and he looks around with a wild and vacant stare; his flanks heave; his pulse becomes quick and hard; and very soon delirium comes on. He throws himself about so quickly and violently that no person dare approach him. He manifests no disposition to do harm. He is in a state of entire unconsciousness. His appearance is indeed terrible. These symptoms continue until the animal dies from being worn out by such violent struggling, or he falls into a profound stupor, with stertorous or snoring breathing, and continues in this condition until he dies. Sometimes convulsions of a most fearful character occur during the progress of the disease, and not unfrequently he dies in convulsions.

Causes.—The name indicates very well the character of this disease. It is an inflammation, either of the substance of the brain itself, or of the thin membrane that surrounds it. When the horse sinks into profound stupor, after having been frantic, as described, this indicates that a watery fluid, called serum, has been thrown out from the inflamed part, and may be found, on examination after death, in considerable quantity about the brain.

Over-working, in hot weather, especially if the horse is fat, may bring on an attack. Or any exposure that will ordinarily give rise to other inflammatory diseases may produce this.

Treatment.—The only chance for treatment in this disease is in the early stage, for so violent are the strugglings of the horse in the latter stages, that no person should be required to run the risk of handling him. Prompt physicking has always been regarded the main reliance in this disease. I prefer giving an

antispasmodic along with the physic. The following will answer the purpose:

Take—Powdered aloes.....	1 ounce.
Powdered lobelia herb	1 ounce.
Powdered gum-arabic.....	1 ounce.
Croton oil.....	20 drops.
Warm water	1 quart

Mix, and give as a drench.

At the same time take from the neck-vein from six to eight quarts, making a large opening in the vein, so that the blood will flow in a large stream. From the first the head should be wrapped in cloths several folds thick, and cold water constantly poured on it. The legs should be frequently rubbed with alcohol, one pint, and powdered Cayenne pepper, one ounce, mixed. A very large blister about the breast and chest will have a good effect in diverting the flow of blood from the head. In an hour after giving the physic, commence with the following:

Take—Tincture digitalis	1 ounce.
Sweet spirits of niter	1 ounce.
Tartar emetic.....	60 grains.
Warm water	1 pint.

Mix, and give as a drench. This dose is to be repeated every two hours, omitting the tincture digitalis, until the pulse falls to the natural standard.

After the disease is subdued, the horse will be very much reduced, and will require something to sustain his strength until the powers of the system rally. For this purpose give carbonate of ammonia, sixty grains, every two hours, until his strength is sufficiently restored to render his condition safe. His diet should be very light for several days. He should be kept in a quiet, well-ventilated stable for some time.

LAMPAS.

This is an affection of the mouth, quite common among young horses, and but seldom met with in old ones. It is char-

acterized by a swelling of the bars of the palate adjoining the gum, at the back of the upper nippers.

Symptoms.—The first symptom that will be observed will be a difficulty of feeding, the horse or colt leaving a portion of his ordinary feed in the trough or manger. On examining the mouth, the bars will be found swollen, red, and sore, being raised nearly or quite as high as the teeth, or even above them. If not cured, but suffered to continue, the animal will lose flesh and get in low condition, and will not improve.

Causes.—The most common cause of lampas is the irritation of the gums, caused by the shedding of the teeth, extending to the bars. Or it may result from a generally feverish condition of the system; but I am of opinion that a very common cause is derangement of the stomach.

Treatment.—Most cases of this disease will get well without treatment, or by allowing the animal soft feed for a short time. I have found the following treatment entirely successful, and regard it preferable to any other. Take a stick of lunar caustic (nitrate of silver), and touch the parts affected once a day for three days. After each application of the caustic, pass a cloth through the mouth and around the muzzle, to keep the tongue from coming in contact with the parts, and let it remain on for a few hours. It may be kept on by fastening it to the halter. This treatment should always be preferred, but as the remedy may not always be at hand, I shall give one or two other successful plans of treatment. Touch the parts quickly over with a hot iron; not so as to burn the flesh, or even blister, but just so as to sear the skin or mucous membrane. If quickly and properly done, this will not destroy the bars or in any way injure the mouth. But if, as I have sometimes seen, the iron is so applied as to destroy the flesh and leave a deep sore, it will do much injury, and the remedy prove worse than the disease. After burning, take a handful of salt and meal, and rub the part well with it, and then take a sharp nail and prick the affected bars in two or three places, near the middle, so as to

draw a small quantity of blood—about half a gill. Another method of treatment is, to prick or puncture the affected bars in several places, near the middle, with a sharp knife or prod, so as to draw considerable blood, and then take about an ounce of powdered alum and a handful of salt, and scour the parts thoroughly with it. While working with the mouth, a stick should be put across, within the mouth, to prevent the horse from shutting it on the hand.

INFLAMMATION OF THE TONGUE.

The marks of inflammation are heat, pain, swelling, and redness. All these attend inflammation of the tongue. They constitute the symptoms of the disease, except the degree of general fever that accompanies it. It is generally the result of injury.

Treatment.—If the case is not very bad, and especially if caused by an injury:

Take—Finely-powdered burnt alum..... $\frac{1}{4}$ pound.

Finely-powdered salt.....1 pound.

Corn-meal 2 pints.

Mix, and apply to the tongue, by means of a swab, three or four times a day.

If the case is very bad, give a physic of aloes with ginger, and bleed to the extent of six quarts. A blister to the upper part of the throat, in a very bad case, would be advisable. The horse should be fed thin gruel and slops.

LUNG FEVER.

This disease is known by the names of *lung fever*, *inflammation of the lungs*, and *pneumonia*. It is an inflammation of the substance of the lungs, or lights, as the butchers call them. It may affect either the right or left lung, or both of them. It sometimes occurs in the form of congestion of the lungs, inflammation proper never taking place; the lung remaining in a

congested state, or engorged with blood, until the animal dies. In most cases, however, the symptoms of active inflammation will soon be discovered. Inflammation of the lungs is one of the most common and fatal diseases the horse is subject to; and its treatment will put the horse doctor's skill to the severest test. He must understand his case clearly and know what to do, and do it with a master hand.

Symptoms.—In the common form of lung fever, the attack commences with much the same symptoms as attend the forming stage of other fevers, or inflammation of other organs; such as coldness of the legs and ears, and sometimes a positive chill, with shivering. A short, dry cough may now be observed, and which may have been present for several days. The horse appears moping and not inclined to move; may hang his head under or rest it in the manger; eats poorly. As yet the true nature of the case may not be suspected, the horse being supposed to be only “a little ailing.” But the second stage of the disease follows, and more marked symptoms make their appearance.

The coldness of the extremities (legs and ears) continues. Unmistakable evidences of fever appear. The body becomes hot, also the mouth; the pulse increased in frequency; the head is thrust forward; the eyes become watery; the membrane of the nose becomes of a bright red hue, covered with mucus, lead color or brown; he stands in a singularly stiff manner, with his fore-legs forward and wide apart; breathing becomes oppressive and difficult, the nostrils working violently, and the flanks heave, with a hurried, quick motion, up and down; he looks at his flanks with an expression of peculiar anxiety; may attempt to drink, but can not swallow to do any good, as it produces coughing, and the water is often thrown out through the nose; the horse obstinately keeps the standing posture.

If the disease is suffered to progress, the above symptoms become aggravated generally. The pulse, which, at the beginning of the first stage, was quite distinct, becomes oppressed,

irregular, and almost imperceptible. This marks the beginning of the third stage, in which the blood is overloaded with poisonous matters, which the lungs have lost the power to remove. The breathing becomes quicker and more laborious; the horse becomes restless or uneasy; may lie down, but will immediately jump up again; the legs and ears become of a death-like coldness; the muzzle also begins to become cold; the bright red of the nostrils has disappeared, and they are of a dull, livid, or leaden hue; twitching of the muscles takes place; the horse grinds his teeth; staggers as he attempts to move; finally falls, and, after a few convulsive struggles, dies.

The disease does not always present the above train of symptoms. In what are called sub-acute cases, the symptoms are not so violent. But there will always be enough present to indicate the nature of the case.

Of the congestive type of pneumonia, in which the lungs are engorged with blood from the first to the last, Mr. Percival says:

"In the worst cases of this kind the animal is all over in a tremor; a cold sweat bedews his body; there is no pulse to be felt; his extremities betray the coldness of death; his eye is frightfully wild, and, together with the boring of the head, and stupidity evinced by him, clearly denote the poor sufferer to be laboring under a species of delirium.

"Should this state of congestion come on in the stable, gradually, and some time after the cause is applied, the horse will show it by appearing dull, listless, heavy-headed, and off his appetite; his respiration (breathing) will gradually become more disturbed and oppressed, indicating much more labor than pain. The pulse will be full and quick, but probably so feeble as hardly to be perceptible. The ear, applied to the chest, detects no sound; the usual respiratory murmur (a sort of murmuring sound produced in the lungs) is lost. The extremities (the legs and ears) have a cold, death-like feel; and, in extreme cases, the mouth is cold also, and the pupils (the sight of the eyes) more or less dilated (spread out, made larger). Cold

sweats supervene; no pulse is to be felt; the animal gradually sinks, and, in convulsions and delirium, dies."

It is of the greatest importance to be able to distinguish one disease from another. The death of the horse may be, and often is, the result of a single dose of medicine given under a mistaken notion of the disease. I shall, therefore, point out the diseases for which inflammation of the lungs is most likely to be mistaken, and the principal symptoms which serve to distinguish them.

It may be mistaken for founder. In lung fever the feet are cold; in founder, hot. In lung fever, the horse drinks with difficulty; in founder, has no trouble drinking. In lung fever, can not lie down; in founder, lies down early in the disease, and generally continues lying. In lung fever, peculiar sounds heard on listening to the lungs; in founder, none.

Lung fever may be mistaken for pleurisy. In pleurisy, the horse has a great aversion to turning around in a circle, and if he is turned, he grunts or groans with pain. There is also extreme tenderness of the side on pressure. But it must not be forgotten that pleurisy and lung fever often exist together, and the case is then called pleuro-pneumonia. Indeed, a case of either pleurisy or pneumonia can hardly terminate without becoming complicated with the other.

Lung fever is very uncertain in its duration. It may terminate fatally in less than eighteen hours; or it may be protracted for many days, and then prove fatal. Generally, however, if the case is going to end in death, it will be from the second to the fifth day. If the horse lives beyond the fifth day, it is a favorable sign.

Pneumonia frequently terminates in dropsy of the chest. When this takes place, it is a close observer who is not deceived by the change of symptoms which occurs. The legs and ears become warm; the appetite returns; the horse appears more lively, and is thought to be getting well. But the coat remains unhealthy; there is a yellowish discharge from the nostrils; the

sounds of the lungs are not natural, and by carefully applying the ear to the side it may be possible to detect the presence of water in the chest; the pulse is irregular, and the horse obstinately persists in standing up, both day and night. After a number of days, or sometimes weeks, the horse is again seized with rigors, or shivering, and he is thought to have relapsed, or taken another attack of lung fever, but very soon dies, despite of all efforts for his relief.

Inflammation of the lungs, also, frequently terminates in what is called *thick-wind*.

Considerable irritation of the lining membrane of the air-cells may remain after an attack of lung fever, and produce a *chronic cough*. The appearances of the lungs, etc., after death by lung fever, deserve notice. Very often the whole of the lungs will appear as one mass of blackness, every trace of their fine structure being destroyed, and the lungs are said to be perfectly rotten. Many persons have been misled by this appearance of the lungs, and supposed that the horse must have been long diseased. This is far from the fact. It results from the lungs becoming powerfully congested or engorged with blood. And this is far more likely to be the case when the disease has run its course rapidly. The adhesion or gluing of the lungs to the chest, which some take, through ignorance, as evidence of long standing disease, Mr. Percival says he "has known to be produced in twenty-four hours." In some cases, where the inflammation has been very violent, but confined to only part of the lung, mortification or gangrene may take place a few hours, or longer, before death. It will be indicated by the peculiar offensiveness of the breath. This does not show disease of long standing, but rather rapid and violent inflammation.

When the case has terminated in dropsy of the chest, the cavity of the chest will be found filled with water, which had accumulated to such an extent as to destroy the action of the lungs and heart and produce suffocation.

Causes.—Nearly all the causes that produce inflammation of

the lungs are the result of bad management or improper exposure. If the horse has taken catarrh or common cold, very little over-exertion, either in riding or driving, and allowing the horse to suddenly cool, will cause inflammation of the lungs. A sudden change from heat to cold, or from cold to heat, may produce it. Riding or driving against a cold, raw wind, or through deep water, when the horse is warm, or any thing that will stop the free perspiration through the skin, may produce an attack of pneumonia. But nothing is so frequently the cause, perhaps, as allowing the horse to stand in a close, illy-ventilated stable, in which the dung is suffered to remain, and the urine stand in puddles. From the filth, dung, and urine, thus allowed to accumulate, irritating gases of ammonia or hartshorn are constantly rising, and, coming in contact with the delicate membrane lining the millions of little air-cells in the lungs, irritate them, and finally produce true inflammation of the lungs, or leave the horse in a condition to take it on the slightest exposure to cold.

Fat horses, and especially if not much exercised or worked, are more apt to take fever than those in lower condition.

Treatment.—The treatment in this disease should be prompt and energetic. This is one of those diseases of the horse which most certainly require bleeding. But some are of the opinion that nauseating treatment will answer as well. There is one great advantage in bleeding: it gives immediate relief; there is no time lost in waiting for its action; and time, in lung fever, is of great value. The treatment should be commenced by bleeding from the neck. The opening should be large, so as to permit the blood to flow in a full stream. The finger should be on the pulse, so as to mark the effect produced. As soon as the pulse becomes full and soft, the bleeding has gone far enough. It will generally require about eight quarts to effect the object. Six quarts taken rapidly will have a better effect than ten taken slowly. Hence the necessity of having the opening of the vein made large.

The next thing to be done after the bleeding is to give the following:

Take—Tartar emetic.....60 grains.
 Sweet spirits of niter..... 1 ounce.
 Tincture of digitalis 1 ounce.
 Warm water..... 1 pint.

Mix, and give as a drench, all at once. Blister the sides of the chest and breast; a very large surface should be blistered. The *liquid blister* should be used, or aqua ammonia.

While waiting for the action of the blister, the cold legs should be rubbed with alcohol, one pint, and powdered Cayenne pepper, one ounce, mixed. This should be frequently used as long as the legs are cold. If the blister is good and well applied, if it does not rise in a reasonable time, there is but little prospect of a cure. In two hours after giving the above drench, repeat it, but leave out the digitalis; or, what is better, use in place of it one ounce of tincture of lobelia. This dose is to be repeated every two hours until the breathing is easy or natural. Then give carbonate of ammonia, sixty grains, in a pint of warm water, every two hours, until the horse is well.

If the tartar emetic does not keep the stomach nauseated or sickened, five or ten grains more might be added to the dose. And if the pulse should rise again after the first dose containing the digitalis is given, it may be repeated again. The object of it is to keep the pulse down.

After the blister has raised and broke, a sheet wrung out of cold water should be thrown over the horse, and about two heavy, dry blankets thrown over it and bound on. This will aid in producing perspiration, and do much good. Sweating is a valuable means of cure in this disease.

During the treatment the horse should be kept in a comfortable stall or shed, where he can breathe plenty of fresh, pure air, for the purpose of purifying the blood.

When the horse commences eating, he might have a little

clean hay, bran, scalded shorts, or cut feed ; but by no means should he be allowed to gorge himself.

I have said nothing about the bowels in treating this disease. It must not be supposed that, because human doctors often give their lung-fever patients physic, the same may be done with the horse laboring under this disease. If the horse's bowels are costive, and it is thought necessary to move them, an injection is all that it would be safe to use. A gallon or two of warm soapsuds, and a couple of handfuls of salt dissolved in it, may be used as an injection, or the same quantity of corn-meal gruel may be used for that purpose. An active physic would be equal to a sentence of death.

PLEURISY.

This is an inflammation of the pleura, or thin, glisteny membrane which lines the inside of the chest and covers the lungs. It is a very active disease, and will very soon destroy the horse, if not promptly treated. The symptoms of this disease and lung fever are very nearly the same. Indeed, the two diseases may both affect the horse at once, commencing at the same time ; or one commencing and then the other coming on afterward. Such a case is called *pleuro-pneumonia*.

Symptoms.—Having just described lung fever, it will only be necessary to point out those symptoms in which pleurisy differs from it. The pulse furnishes the most marked difference. As the blood in this disease is not obstructed in its passage through the lungs, as it is in lung fever, we have not the small, oppressed pulse of that disease, but a hard, full pulse, surely indicating inflammation. The feet and legs are cold, but not so cold as in lung fever. The membrane of the nose is somewhat red, but not so intensely red as when the lungs are the seat of the inflammation. If the side of the patient is pressed on over the seat of the disease in pleurisy, pain will be felt, as indicated by the peculiar grunt the horse will give. The manner of standing, and the obstinacy with which the horse keeps on

his feet, are about the same in both diseases. If it is attempted to move the horse round in a short circle, he will grunt, and show evident signs of pain, if the pleura is inflamed. This symptom may be relied on to distinguish it from all other diseases.

Causes.—The same causes described as giving rise to lung fever may cause pleurisy.

Treatment.—The treatment of this disease is just the same as described for lung fever. In this disease, however, a physic might be given without so much danger. See treatment of lung fever.

If the disease has terminated in a collection of serum, or fluid, in the chest, the case will prove fatal, even though the horse may remain comfortable for a short time.

PLEURO-PNEUMONIA

The above name is given to an inflammation of the lungs and pleura. It may occur during the progress of either pleurisy or lung fever, or both structures may be attacked at once. The disease generally assumes what is called a typhoid state. Pleuro-pneumonia has prevailed as an epidemic in different parts of the country, in which it has proved very fatal, destroying a large portion of the horses.

Symptoms.—In the early stage, these resemble the symptoms of lung fever or pleurisy. Prostration of strength very soon comes on, and the grave character of the disease is apparent. The membrane of the nose is of a dark, leaden, blue color; the breath is very offensive; the throat sore, and the glands about the mouth and throat are swollen. The pulse is quick and feeble; the water is high colored, and the dung scanty, and passed in round lumps. The horse sinks rapidly, and the coat looks as if he had been dead for several days.

Treatment.—Stimulants and tonics are called for in this disease. Brandy, whisky, carbonate of ammonia, tincture of prickly-ash berries, and Cayenne pepper, may be given in proper doses, and repeated every two or three hours. Gentian

and Peruvian bark may be given. Also, salt may be given freely as a drench. I would recommend the whisky sweat, in the beginning, followed by warm blanketing.

BRONCHITIS.

This is an inflammation of the mucous membrane of the bronchial tubes, or larger divisions of the windpipe.

Symptoms.—The first symptoms of bronchitis are much the same as those of common cold, but more severe. There is cough, and evident soreness of the throat, and considerable fever; the mouth and nose are red; the breathing is hurried and thick; the pulse is quick and wiry. Large quantities of mucus are coughed up in some cases; first of a gluey white color, then yellow, and after awhile becoming greenish, and then white again. It frequently prevails in an epidemic form. It may leave the horse with a chronic cough.

Causes.—Exposure to sudden changes from heat to cold, or sudden checking of perspiration, from any cause, may produce it.

Treatment.—The back and under part of the throat, and the chest, should be blistered, using the "*liquid blister*." The horse should be clothed warm, and the legs rubbed with flannel cloths frequently. Internally give:

Take—Tartar emetic.....60 grains.

Sweet spirits of niter..... 1 ounce.

Tincture of digitalis..... 1 ounce.

Mix, and give in warm water.

If the pulse is not under the effect of the medicine in two hours, this dose may be repeated, leaving out the digitalis. Then the following may be given, until the disease is broken up:

Take—Powdered lobelia leaves.....2 ounces.

Powdered blood-root.....1 ounce.

Powdered ipecac.....2 ounces.

Mix, and give two tea-spoonfuls three times a day, in warm flax-seed tea.

FOUNDER.

Several different names have been given to this disease. It has been called acute inflammation of the feet; acute rheumatism; and some cases have been named, from the supposed cause of the attack, water-founder, feed-founder, etc. It is also treated of by writers under the names of chest-founder, body-founder, and feet-founder; the name being used to designate the location of the disease.

The word founder, in seamen's language, means "filling with water;" and it is more than likely it was used in the first place as a name for this disease, from its supposed origin in drinking too much water. I attach no particular meaning to the word. I use it simply as a name, which has been in long and general use.

I am certainly of the opinion that founder is rheumatism. But this name is much like the other. It is derived from two Greek words, one meaning "a watery humor," and the other meaning "to flow." So the same objection that may be urged against founder as a name, may also be brought against rheumatism.

Symptoms.—Founder is generally very sudden in its attack, in most cases the disease being fully developed before it is noticed by the owner or groom. In many cases the horse will be found, the next morning after exposure, in a great "rack of pain;" and a train of symptoms will be observed, not always the same, but usually sufficiently similar to point out the nature of the malady. But it must not be understood that founder is always easily determined. It has been overlooked even by the veterinary surgeon.

That form of the disease which attacks the feet, as its principal seat, or point of first attack, has been called feet-founder.

The first symptoms likely to attract attention will be an uneasiness in standing on the fore-feet, the horse frequently changing the weight from one to the other, but avoiding any thing like violent motion or pawing. As the inflammation, which is

chiefly located in the sensitive lamellæ, progresses, the pain and tenderness in the feet increase, and symptoms of general disturbance and fever appear. Redness of the nostrils, laborious or hard breathing, heaving of the flanks, quick pulse, anxious expression, and sometimes groaning, indicate disease of a violent character. His restlessness and anxiety increase; all the symptoms become more aggravated; he looks about as if preparing to lie down, but evidently being afraid to attempt bringing his feet sufficiently under him to do so. At length, however, after having changed his feet until relief from it is lost, and not being able to lie down naturally, he drops, and continues lying on his side, showing no disposition to get up again. He does not manifest near so much pain when down; keeps his feet still, and often raises his head and looks at his feet, or even rests his muzzle on them, thus plainly pointing out the seat of his misery.

On examining the feet affected, or feeling with the hand, they will be found hot and tender—the horse manifesting pain on pressure, or a very light tap with a hammer. The artery at the pastern will throb violently. If forced to get up, he will have the greatest difficulty in standing, or will soon lie down from intensity of pain.

If the disease is suffered to progress, the inflammation may subside, and the horse gradually recover; but he may die from extreme suffering and exhaustion. But the inflammation may terminate in effusion into the cavity of the foot, and, as this takes place, a separation of the sensitive and horny lamellæ commences; and, if this becomes complete, in a few days, perhaps six or eight days after the commencement of the attack, the wall of the hoof will be found to have commenced separating from the skin. This separation may continue, and a new hoof eventually be formed in its place, but the horse would be more apt to die; but it will be smaller and weaker than the first. This process is very slow and harassing, and the horse may die before it is complete. I never saw one to

survive it. The hoof may not separate entirely, and the coffin-bone, only being partially supported, descends and rests on the sole, producing what is called a pumiced foot.

That variety of founder called chest-founder is characterized by all the general symptoms of the disease as above described. But the principal seat of the inflammation is the muscles of the breast and chest, which will be found hot, tender, and swollen. There will be great lameness, pain, and stiffness in moving. After the inflammation has subsided, or becomes more of a chronic form, a great wasting away of the muscles of the chest, particularly of those about the breast, will occur, giving the horse an unnatural, ugly hollowness about the breast.

Body-founder is much of the same character as chest-founder; the chief difference being, that the tenderness and inflammation of the muscles, as well as the lameness, are more general.

A peculiar characteristic is its migratory (moving) character, or disposition to change from one place to another. It may suddenly leave the body and locate in the feet, or go from the feet to the lungs, or heart or pleura; and when thus setting on the heart, is quite certain to prove fatal. It is this migratory character of the disease, the tissues or parts which it attacks, the general train of its symptoms, and the causes which are known to produce it, that establish its character as rheumatism.

It requires some care to distinguish founder from some other diseases. I will present a few of the distinguishing symptoms. It is, perhaps, most likely to be confounded with lung fever.

In lung fever the limbs are cold; in founder, hot. In lung fever, can not drink; in founder, no difficulty in drinking. In lung fever, can not lie down, but stands still; in founder, keeps constantly moving when standing, and lies down or drops, and continues lying, early in the disease. In lung fever, certain peculiar sounds in the lungs; in founder, only the natural ones, slightly increased by the general fever present.

The quietness of the horse when lying down will distinguish founder from colic or inflammation of the bowels, in which he

lies down, rolls, jumps up, and lies down again, etc.; and in which he points with his muzzle to the side, while in the most common variety of founder he points to the feet.

Causes, etc.—The recognized causes of founder are quite as various as the symptoms of the disease. They are somewhat similar to those that produce other inflammatory diseases. A sudden check of the perspiration through the skin, by exposing the animal to cold or wind when too warm, may bring on an attack of founder. It is often brought on by a particular part of the body being chilled. This is the case when he takes it from drinking cold water when he is hot. This chills the blood in the parts the water passes over or comes in contact with, and, by its mixing with the rest of the blood of the system, the temperature or heat of the body is suddenly reduced, and perspiration through the skin is checked just as quick as if the cold had been applied to the skin. The skin is constantly throwing off fine particles of poisonous, worn-out matter, and poisonous gases, which, if kept back, must produce disease. When the skin is chilled, as explained above, its pores contract or draw up, and these poisonous things can not pass out through the skin, and then, if they do not find some other way to get out, they produce inflammation of the lungs, feet, or other parts.

Standing in cold water when the horse is hot is very likely to produce founder. Washing the legs with cold water, feeding the horse more than he can digest when tired and hungry, exposing the horse to rain, wind, or snow, and particularly traveling through snow, are fruitful causes. An over-feed at any time is often the cause of founder. A sudden change from cold to hot will likewise produce founder, as when the horse has been driven through the cold and put in a warm stable, and straw piled up to his knees. This invites such a rapid flow of blood to the feet as to cause inflammation.

Some writers tell us that founder is sometimes produced by other diseases leaving the part affected and going to the feet. Inflammation of the eyes, lungs, bowels, etc., have been known

thus to change their location. I think, however, in all such cases the disease was of a rheumatic character from the first.

Severe or long-continued racing, or traveling on hard roads, is a very common cause of inflammation of the sensitive lamellæ. These parts, being over-strained or excessively exercised, are very liable to become inflamed, and especially if, from constitutional predisposition or bad management, his system is in a condition favorable to take on founder.

Treatment.—This is a disease which, if not arrested soon, will very likely be attended by very serious consequences, either the entire destruction of the feet, permanent lameness, or death.

The first thing to be done is to bleed, from the neck, about six or seven quarts, from a large opening in the vein; or, both the neck-vein and the vein of the leg may be opened. As soon as possible give the following:

Take—Spirits of turpentine.....	1 ounce.
Oil of sassafras.....	1 ounce.
Alum, powdered.....	1 ounce.
Warm water	1 pint.

Mix, and give as a drench.

Bathe the legs with warm water. Take off the shoes and pare out the bottoms of the feet, removing all the dead horn. Fill the hoofs with very hot lard, and hold them until it cools. Then put on the shoes again. If necessary, the drench may be repeated in twelve hours, and so on until cured. If the inflammation should remove to the lungs, it will have to be treated for lung fever. Allow the horse light feed and rest for a few days.

INFLAMMATION OF THE BOWELS.

The mucous membrane, or inner lining of the intestines, is liable to become inflamed, and which, in scientific language, is called *enteritis*, and, in common language, *inflammation of the bowels*. It is a very dangerous disease if neglected or badly

treated. It is also a disease which is often mistaken for some other ailment; and hence its symptoms should be carefully studied, as the only sure way to avoid mistakes.

Symptoms.—If the horse be carefully observed, there will be seen symptoms of fever present; but after awhile there will be observed restlessness, looking around at the side, and tenderness of the bowels, on pressure by the hand. And though the symptoms, in the earlier stage of the disease, somewhat resemble those of colic, the pain will be found to be continuous, while in colic it comes on by spells. In inflammation of the bowels, the pulse is increased in frequency, and increases as the disease progresses. The belly becomes very tender, and the slightest pressure on it gives great pain; it is tight, and drawn up; the nostrils open wide, and the breathing is very rapid. Some degree of heat about the mouth, and redness of the inside of the nose and mouth, will be observed. To move seems to increase his pain; he looks anxiously at his flanks, and groans; he champs and grinds his teeth together; he lies down at full length on his side, throws his head back, and paws with his fore-feet. He sweats profusely; becomes weak and tremulous; the eyes become glary; the lips hang loosely; the sweat becomes cold, and the powers of life fail. During the progress of the disease, the bowels may be costive, and the balls of dung passed covered with mucus. But inflammation of the bowels may be caused by over-action of physis, and, when so caused, the bowels will be very loose during the progress of the disease.

The diseases for which inflammation of the inner coat of the bowels may be mistaken, are its kindred diseases—inflammation of the stomach and bowels, and inflammation of the *peritoneum*, or outer covering of the bowels, and for colic.

To distinguish it from colic, see the article on that disease, where the principal differences are given, side by side.

The symptoms of inflammation of the outer covering of the bowels are more severe, and the disease runs its course more

rapidly than in inflammation of the mucous lining of the bowels. Careful attention to the symptoms may show which it is. However, the treatment for both diseases is nearly the same, and the mistaking the one for the other would not be likely to prove serious.

Inflammation of the stomach and bowels is attended with much greater disturbance of other parts of the system than either of the other two diseases under consideration.

Causes.—The causes which may give rise to an attack of inflammation of the mucous or inner coat of the bowels are quite numerous. Too powerful physicking has already been referred to as causing it. It is also one of the results of colic, and the certain effect of those strange tanglings of the guts, described under the head of *knotting of the bowels*. Any thing that will give rise to irritation of the bowels may cause it: exposure to cold or wet, as standing in the rain, or being exposed to a heavy draught, after being worked hard. A change from dry to green feed, or unwholesome food, may cause it. Costiveness will often be found to be the cause. The contents of the bowels becoming dried up, necessarily produces irritation, and this may result in inflammation. Over-fatigue may cause it.

Treatment.—Few diseases require more prompt or more energetic treatment than inflammation of the bowels. It runs its course very rapidly, and, without proper treatment, proves very fatal. It requires the most energetic measures we can make use of for its removal; and as bleeding is, beyond doubt, the most prompt in overcoming inflammation of any means we possess, it is especially called for in this disease. As soon, then, as the case is found to be one of inflammation of the bowels, bleed from six to ten quarts, or until the pulse becomes full and round. At any time afterward, during the treatment of the case, if the inflammation should be observed to be coming up again, another bleeding may be necessary; but the desired effect on the pulse may not require so much blood to be taken as before.

Immediately after the first bleeding, inject the following into the rectum, for the purpose of opening the bowels. It will not do to give common physic. Warm water, one gallon, with half an ounce of aloes dissolved in it, and a pint of linseed oil mixed in. If the horse is very weak, use thin gruel in place of the water. If the horse will drink water, about milk-warm, let him have it freely.

After the injection has been given, apply a blister, extending from the point of the breast-bone back under the belly, and about six inches up over the seat of greatest tenderness on the side. For this purpose use the liquid blister.

After the blister has raised, and the horse becomes quiet, administer the following drench :

Take—Warm water.....	1 quart.
Powdered aloes.....	2 drams.
Linseed oil.....	1 pint.

Mix. This will open the bowels and not irritate them.

As soon as possible, bandage the legs thick, and keep the clothes wet with warm water. They must not be allowed to get cold. He may be allowed to drink thin gruel after the active symptoms of the disease pass off. When recovering, he may have bran mash and scalded shorts.

If the case is caused by over-physicking, and the purging is violent, give the horse plenty of thin gruel or starch. It can be given as a drench, a quart at a time. By this means the bowels are soothed, and the remains of any thing that was irritating them may be carried off. After ten or twelve hours, if the purging has not stopped, treat it as recommended for diarrhea, which see.

INFLAMMATION OF THE PERITONEUM.

This is an inflammation of that extensive, tough, smooth membrane which lines the inside of the walls of the abdomen (or belly), and which is thrown in folds around all of the bowels

and organs within the belly. It is a very severe form of inflammation, and often proves fatal. The inflammation is generally confined to only a part of the peritoneum.

Symptoms.—Inflammation of the peritoneum, or investing membrane of the bowels, is characterized by very nearly the same symptoms as inflammation of the inner coat of the bowels. It is somewhat difficult to distinguish them. For this reason their symptoms should be well studied.

The attack of inflammation of the peritoneum is often ushered in by a distinct chill, as shown by his shivering. Restlessness and fever follow the chill, or will be observed when no chill may have been perceived. The mouth will be found to be hotter than natural, and the nostrils red. The symptoms of pain soon become very severe, as shown by the horse pawing, striking at his belly, groaning, looking at his flanks, and rolling. The bowels will be very costive, and great tenderness and often heat of the belly over the seat of the inflammation. The pulse will be quick and small, and the ears and legs cold. Profuse sweating and great weakness, and the most anxious expression of the countenance, indicate the advanced stage of the disease. The progress of this disease is very rapid.

It is best distinguished from inflammation of the internal coat of the bowels by the greater severity of the misery and its very rapid progress. To distinguish it from colic, see that disease. It is often called bots by the ignorant. Avoid this foolish error.

Causes.—Cold is the great cause of inflammation of every kind. The animal being heated and perspiring, or sweating, and then suddenly exposed to the cold air or rain, checks the perspiration, and irritation or inflammation of some internal part is almost sure to follow. A horse that is kept in the stable and used but little, and then worked until he becomes heated, and allowed to stand in the cold or exposed to a shower, or if his belly be washed with cold water, will be very likely to be attacked by inflammation of the peritoneum.

Treatment.—The treatment recommended for inflammation of the bowels is the best that can be pursued in this disease. But the bleeding may be carried to a greater extent, and the blistering may extend further up on the sides. In addition to the means there made use of, I would recommend the use of the whisky sweat for one hour at some early period of the treatment.

INFLAMMATION OF THE LIVER.

This is not a very common disease in the horse, but is a very severe one when it does happen.

Symptoms.—These are nearly the same as the symptoms of inflammation of the bowels. The pain and tenderness will be more confined to the seat of the liver. But the principal sign by which it is to be known from inflammation of the bowels is the rapid appearance of yellowness of the mouth and eyes. Even this yellowness may not, in some cases, be present, or so slight as not to be observed.

Causes.—Food that is capable of producing over-stimulation of the liver, and, after exposure to severe exercise and cold, may cause an attack of inflammation of the liver. It may be followed by jaundice, or softening of the liver.

Treatment.—A large blister should be applied over the liver. The following cathartic should then be given :

Take—Powdered aloes.....	1 ounce.
Powdered May-apple root.....	4 drams.
Powdered ginger.....	2 drams.
Warm water.....	1 pint.

Mix, and give as a drench. After it acts on the bowels, give one dram of the May-apple root, in warm water, every twelve hours, to keep up its action on the liver. Let the horse have light diet until well.

INFLAMMATION OF THE KIDNEYS.

This disease is of more frequent occurrence than might be supposed. It is met with in the acute and chronic form. We are considering first the acute form.

Symptoms.—A straddling in the hind-legs, a constant straining and effort to make water, the water being passed in small quantity, and sometimes bloody, but mostly natural in appearance, are common symptoms. Pressing over the kidneys will show that it produces pain. The pulse and breathing are increased.

Causes.—Strain of the kidneys will cause inflammation in them. A lick over the kidneys, the foolish use of diuretic medicines, too free use of turpentine or resin, will cause it. Blisters may sometimes cause it. A blister all around the leg is said to cause it, or strangury.

Treatment.—The object in this case is to reduce the inflammation in the kidneys; and, for several reasons, many difficulties stand in the way. The urine itself becomes very irritating to the diseased kidneys. Their great distance from the surface and from the center of circulation render them difficult to influence by treatment. The treatment should be prompt and active. At least six or eight quarts of blood should be taken from the neck-vein. At the same time a physic should be given.

Take—Aloes, powdered 8 drams.

Podophyllin 20 grains.

Mix, and give in a pint of warm water, as a drench. Twelve hours after the physic has been given, have the horse walk around a little, to cause it to act better.

The loins, over the kidneys, should be rubbed thoroughly with the following:

Take—Alcohol 1 pint.

Powdered capsicum 1 ounce

Aqua ammonia $\frac{1}{2}$ pint.

Mix. This may be repeated in a day or two.

The horse may drink cold water. Flax-seed tea may be given freely. He may eat scalded shorts, thin gruel, and chop-feed, or any thing not stimulating.

INFLAMMATION OF THE BLADDER.

This is an inflammation of the mucous membrane, or inner lining of the bladder.

Symptoms.—The symptoms of inflammation of the bladder are: Considerable fever, great anxiety of the countenance, constant straining efforts to pass water, but very little being passed, and that dribbling away. The horse straddles as he moves about, as if fearing to bring his thighs together. The means of distinguishing inflammation of the bladder from inflammation of the kidneys are: In inflammation of the kidneys there will be tenderness over the kidneys on pressure, but not in inflammation of the bladder; in inflammation of the bladder, if the hand is passed into the rectum or last gut, the bladder can be felt under it, and it will be swollen hard and very hot; in inflammation of the kidneys the bladder will be felt, but not generally so full, and will not be hotter than natural, or than the other parts about the hand. This is the best way of distinguishing the two diseases.

Causes.—This disease may arise, as other inflammatory diseases, from exposure to cold, overheat, and sudden checking of the perspiration, etc. It may be caused by irritating medicines given the horse for other disorders, or stones in the bladder may cause it. Disease of other parts near the bladder may cause the bladder to become inflamed.

Treatment.—If the treatment is not such as to give relief very soon, a fatal termination will be the result. There is no time for trifling. The same amount of blood should be taken as in inflammation of the kidneys; also, the same cathartic given.

For the purpose of lessening the action of the heart and arteries, and relaxing the neck of the bladder, give the following:

Take—Powdered lobelia herb.....1 ounce.

Powdered blood-root.....1 ounce.

Mix, and divide in eight equal parts. One part to be given every three hours in a pint of warm water, as a drench.

Commence the use of the above one hour after the cathartic is given. If the patient is a mare, the water may be easily drawn off with a catheter. If a horse, an operation will be necessary. See the article on *the catheter*. The whisky sweat is a very valuable agent in this disease. It may be used every day. Or, *the wet sheet* may be used, and will do much good. See the article, *wet packing*. Marsh-mallow, slippery-elm, or gum-arabic water may be given freely. He should be kept warm, and have fresh air. The diet, for several days, should be light, but not stimulating.

INFLAMMATION OF THE WOMB.

This is an inflammation of the uterus, or womb, which attacks mares a few days after foaling, or after an abortion.

Symptoms.—This disease commences with the same symptoms which attend most inflammatory diseases—a chill, followed with rapid breathing, high pulse, redness of the nostrils, and cold extremities or legs. The symptoms which will enable the observer to tell that it is a case of inflammation of the womb are, the time at which it occurs, the tenderness and hardness which can be felt at the back part of the loins, and the free sweating there. When up, the mare stands with her hind-legs wide apart, but she lies down most of the time. The bearing will be swollen, and, on opening it, the vagina, or passage to the womb, will be very red and hot.

Causes.—Severe labor, taking cold after foaling, or the membranes which envelope the colt not coming away, may cause it. Mares that are in good condition are most liable to it.

Treatment.—This must be prompt and vigorous, or it can be of but little value. Bleed from the neck-vein largely. Then :

Take—Tartar emetic.....60 grains.

Sweet spirits of niter..... 1 ounce.

Tincture of digitalis..... 1 ounce.

Mix, and give in one pint of warm water as a drench.

After two hours give the same, leaving out the digitalis, and

so on until the inflammation is subdued. Then give sixty grains of carbonate of ammonia every two hours, in warm water, until the strength and health seem restored. Rub the legs with alcohol, one pint, and capsicum, one ounce. If the bowels are costive at the start, give forty grains of podophyllin.

GENERAL FEVERS—ALL CONTAGIOUS.

FEVER.

THE subject of fever is one which has perplexed the minds of medical men from the beginning of medical investigation. I do not propose to examine the different theories that have been advanced. I only propose to give what seems to me to be a reasonable explanation of it. Fever is an increase of the heat or temperature of the animal body. It is a remarkable fact that, in the state of health, though there are several sources of heat in the animal body, and as many agencies operating on it of a cooling nature, there is never a change in the temperature of the body of any consequence; not, in the extreme, amounting to over one or two degrees. Now, when this temperature or animal heat becomes increased, that unhealthy condition called *fever* exists. That it is an unhealthy condition is clear, from the fact that, if such increased heat were to continue, the life of the animal would, in no great time, be destroyed. The principal source of heat in the animal body is the combustion which takes place between the oxygen of the air, taken in by the lungs, and the carbon carried in the blood. Other chemical actions going on in the system produce heat; and, if it were not for the cooling processes spoken of, this heat would soon become so great as to carry destruction to every part of the system. Now, if, from any cause, that balance between the chemical actions producing heat and those processes cooling

the system become disturbed, so that the former are greatly increased or the latter diminished, fever will be the result. It matters not whether this disturbance in the system be brought about by a checking of perspiration, causing obstruction and then inflammation in some organ, as the lungs, pleura, etc., or whether it be the result of contagion or miasma, received through the lungs, the result, in either case, is fever. A fever which is produced, in the first place, by a cause acting generally, may locate its principal ravages in some particular organ or part. Each type of fever expends its most destructive power on some particular part of the system.

Those diseases commonly termed fevers are not so common among horses as among the human family. Simple scarlet fever, malignant scarlet fever, and putrid and typhus fevers, deserve a brief notice.

SIMPLE SCARLET FEVER.

Simple scarlet fever will generally be observed to come on when the horse is laboring under epidemic catarrh, and about the third or fourth day of the attack, and very often when the case was doing well. The symptoms which indicate its presence are: The hair about the head and neck will be found elevated or turned up in spots, and the same appearance on the limbs, which will also be swollen. The skin under these spots is only a little thickened. The most decided symptom is the scarlet spots on the inside of the nose, of different sizes. There may be soreness of the throat, or it may be free from any thing of the kind. Of course, some degree of general fever attends the case. If promptly and properly managed, the disease continues mild until its termination. But it may run into the malignant form of the disease, or death may result from the blood becoming broken down by the disease.

Treatment.—The horse should be placed in a dry, clean stable, where he will have pure air. He should have light diet at first, but, as the disease subsides, a little stronger food. Water,

made slightly sour with cream of tartar, is a good drink while there is fever. The free use of salt will be beneficial in this case. If the bowels become costive, give about thirty grains of podophyllin in a pint of water. If there is much fever, and the case seems to be becoming bad, some medicine may be required more than above.

Take—Tincture of belladonna.....1 ounce.

Tincture of wild indigo.....4 ounces.

Mix, and give one table-spoonful in water, as a drench, every eight hours.

The dose may be increased about one-fourth part the second day.

When getting well, the horse needs good feeding.

MALIGNANT SCARLET FEVER.

This is only the severe form of the disease. The case may be so marked from the first that it can not be doubted that it is going to be the malignant form of the disease. A case, mild at first, may run into the malignant form.

Symptoms.—The usual symptoms of cold, after a few days, are followed by obstinate soreness of the throat, weakness, fever, a mattery discharge from the nose, and loss of appetite. Hot, hard, and painful swelling of the limbs takes place, and the same blotched or spotted appearance of the hair described in the other form of the disease. Large-sized spots, of a deep scarlet color, appear in the nostrils, and a discharge of bloody water runs from them. The soreness of the throat, the difficulty in swallowing, and the cough become worse. The breathing is much oppressed, and the pulse may reach ninety or one hundred per minute. The swollen limbs become very tender, and the horse will stand in a fixed position for hours, and will hardly move. The disease progresses, and after awhile blisters appear on the limbs, and about the joints particularly. After awhile these blisters burst and discharge an amber-colored fluid, which irritates the parts it runs over,

and a sloughing sore takes the place of the blister. The bowels are costive; the water scant, thick, and high colored. The scarlet spots in the nose become darker, and mattering sores take their places. Some very singular appearances sometimes occur. A portion of the ear may dry up, and in a few days break off, leaving a mattering sore. The duration of the attack, from the commencement of the malignant symptoms, is generally from five to eight days. Improvement should take place in that time, if the case is going to terminate favorably.

Causes.—But little light can be thrown on the cause of scarlet fever. It is often owing to epidemic influence.

Treatment.—A clean stable, pure air, and good, wholesome, soft feed, well seasoned with salt, are important in this disease. I should use the following articles from the commencement, with a view of the specific effect of the belladonna, and the stimulant and antiseptic effect of the wild indigo:

Take—Tincture of belladonna.....1 ounce.

Tincture of wild indigo.....4 ounces.

Mix. Dose—One table-spoonful three times a day, and increase the dose one tea-spoonful every day for two days, and then continue its use. To be given in water, as a drench, or in the horse's drink.

I would give, also, to keep the bowels open, about ten or fifteen grains of podophyllin, once a day, with one of the above doses. In view of more perfectly relieving the soreness of the throat, and for its effects on the system, the following may be used:

Take—Compound tincture of myrrh and capsicum, 1 ounce.

Tincture of cubebs.....1 ounce.

Mix, and give at a dose, in half a pint of water. To be given twice a day.

The following ointment may be applied to the sores:

Take—Finely-powdered myrrh.....4 drams.

Finely-powdered camphor.....2 drams

Lard..... $\frac{1}{2}$ pint.

Mix, to form an ointment.

If the sores do not look as if they were going to heal, sprinkle them with burnt alum before using the ointment.

After the horse is well, he will require good care and feeding to get him fit for use. Some simple tonic, as golden-seal and poplar-bark, might be given once or twice a day, in doses of one or two drams of the golden-seal, and one ounce of the poplar-bark, in the feed.

TYPHUS FEVER.

This disease is not very often met with among horses. It is a low form of general fever, but its principal evil effects being expended on the lungs or bowels.

Symptoms.—The teeth, tongue, and mouth are very offensive and coated; the pulse is quick, soft, and feeble; the breath is very offensive; the color of the membrane of the nose is dark. As the disease progresses, the coat on the tongue and teeth becomes dark, and cracks on the tongue appear, and the gums bleed. There is great thirst, and no appetite. If the hand is passed over the body, small lumps or eruptions may be felt: these are characteristic of the disease.

When the lungs are principally affected, the breathing will be very difficult, and the bowels costive; but when the bowels are the main seat of injury, they will be loose; the discharge will be dark, slimy, and offensive. Mortification terminates the case, when it proves fatal.

Treatment.—I should give water, made sour with cider, cream of tartar, or vinegar, as a drink. In the early stage, give fifty grains of podophyllin. Then:

Take—Tincture of prickly-ash berries.....4 ounces.

Tincture of wild indigo 4 ounces.

Tincture of capsicum.....2 ounces.

Mix, and give two table-spoonfuls every four hours, in a pint of water, as a drench.

This disease is infectious, and, probably, contagious.

PUTRID FEVER.

This disease has committed great ravages in those portions of country where it has prevailed. Where it has appeared as an epidemic, it has carried off about two-thirds of the horses.

Symptoms.—I shall only give such a description of this malady as will enable the reader to recognize it when it makes its appearance. Great weakness and prostration, which rapidly increase. The horse walks in a wrangling or striding manner; is very thirsty, and would appear to drink enormously, from the time he continues at the trough, but he is unable to swallow. He finally lies down, and is too weak to get up again; he paws, and shows great signs of pain. The pulse is very weak; the breathing is short, and a rattling sound is in the throat; a froth like soapsuds obstructs the air passages; the horse coughs, but is too weak to effect any thing. Very great congestion of the lungs soon takes place; the pulse becomes weak, the legs and ears cold. Sometimes a great discharge of saliva takes place from the mouth, and the breath is very offensive. The bowels are generally costive, but when discharges do take place, they are covered with slime. The temperature of the skin is generally below health, but sometimes the heat rises very high. The countenance is anxious and haggard. Epidemic influence seems to be the cause of this fearful plague.

Treatment.—In cases where the strength is not extremely enfeebled, give the following:

Take—Powdered camphor.....1 dram.

Powdered niter..... $\frac{1}{2}$ ounce.

Mix, and give in half a pint of warm water, as a drench. To be given every six hours.

To act on the bowels give one ounce of aloes, thirty grains of podophyllin, and half an ounce of capsicum, in a pint of warm water. If the strength fails after the flow of water is increased, the niter may be omitted in the first prescription, and the camphor given with the following:

Take—Tincture of prickly-ash berries.....4 ounces.

Tincture of wild indigo.....4 ounces.

Tincture of capsicum.....2 ounces.

Mix, and give two table-spoonfuls every six hours, in a pint of warm water, as a drench.

Injections should be given to aid the physic in operating. The horse should be helped up occasionally, if he can not get up himself. The throat may be gargled or washed out with a tea made of capsicum, water, and vinegar, every two or three hours. Bathe the throat and chest with capsicum liniment three times a day. Scalded shorts, gruel, etc., may be given as his diet.

CATARRHAL FEVER—INFLUENZA.

A perfect Babel of confusion prevails among authors with regard to this disease. It has been called by the various names of *pink-eye*, *horse-ail*, *distemper*, *influenza*, *epidemic catarrh*, etc. It has been treated quite as variously as named. It is very apt to occur among many horses in the same neighborhood at the same time, and frequently appears to spread as if it was contagious. Horses taken from the country to the city are almost certain to undergo an attack of this disease. It occurs most frequently in the spring and late in the fall.

Symptoms.—The first symptom of catarrhal fever is a chilly fit or paroxysm; but it is very seldom this symptom will be observed. The horse will be found languid, or lazy, and will hardly move at all. He seems very weak; is off his feed; the breathing is difficult, the air evidently passing up the nostrils with difficulty. The eyes are red and bleary; the patient swallows with great difficulty, even water; the feet and legs are cold in the earlier stages of the disease; the pulse is increased in frequency; the dung and urine are passed in small quantities. The patient becomes haggard and worn down very rapidly from the first. Very early in the disease, a watery swelling of the legs takes place. This is particularly the case in large cities. This swelling may extend to the

groins and sheath. A discharge from the nose, of a yellow mucus, takes place after a few days, and this is regarded as a favorable symptom. The tongue is covered with a thick coat, and saliva runs freely, except in some cases, when the mouth and tongue are very dry and red.

In a favorable case, the symptoms before described gradually become less severe, and finally disappear. The ordinary duration of an attack, properly treated, would be but a few days; if left to nature, it may run its course in a week or two. Catarrhal fever may terminate in suppuration or abscess of the glands under the jaw, or may run into inflammation of the lungs, or even glanders, if neglected or improperly treated.

Causes.—The exact cause of this disease is not very satisfactorily understood. It may be regarded as one of those diseases originating in cold, and assuming an epidemic form.

Treatment.—Fresh air, good clothing, and bedding are very useful measures for the comfort of the patient. If the limbs are cold, bleed the horse to the extent of only from two to four quarts. Then give the following:

Take—Powdered blood-root.....	2 ounces.
Powdered gentian.....	2 ounces.
Sulphur.....	2 ounces.
Saltpeter.....	2 ounces.

Mix, and give one tea-spoonful twice a day, in a pint of flax-seed tea.

The limbs should be well rubbed with flannel cloths.

A mild cathartic may be necessary. The following is a suitable one:

Take—Aloes.....	1 ounce.
Ginger.....	2 drams.

Mix, and give in warm water.

Blister the under and forward part of the throat, using the "*liquid blister*."

Let the horse have slop-feed and plenty of salt.

CONTAGIOUS DISEASES.

COLD, OR CATARRH

THIS affection is so well known, and so common, among both men and horses, as scarcely to require description. But it is a much more important ailment than many may suppose. It is often the forerunner or cause of the most fatal diseases.

Symptoms.—The more prominent symptoms are a soft or loose cough, with catching of the breath after the paroxysm of coughing; a slight, clear discharge from the nose and eyes, and diminution of the appetite. There is but little departure from health, though the cough may be very alarming, if it were not known what was the matter. When the cold *breaks*, a very copious discharge takes place from the nose, and this should occur in three or four days, or more serious trouble may be the result.

Causes.—Change of the horse from a warm to a cold place; letting him cool too suddenly when hot; allowing him to stand in the rain or snow after exercise; and any thing that will cause the skin to become chilled and perspiration stopped. Cold should be carefully guarded against.

Treatment.—The following prescription will generally cure a cold:

Take—Sweet spirits of niter.....	1 ounce.
Morphine	13 grains.
Balsam copaiba	1 ounce.
Warm water.....	1 pint.

Mix, and give as a drench.

After twelve hours, commence with the following:

Take—Tartar emetic	1 ounce.
Resin.....	2 ounces
Blood-root.	1 ounce.
Salts of tartar.....	2 ounces.
Ginger.....	2 ounces.

Mix. Give one tea-spoonful three times a day, in the feed, which should be cut or chopped feed.

STRANGLES.

This disease is known in some localities by the name of *distemper*; in others, *horse-ail*. But these terms are very objectionable, as they might, with equal propriety, be applied to almost any other affection.

Strangles is a disease common to young horses, very few escaping an attack of it. Some colts will have it at a very early age—some at one year, and from this up to five; more generally it occurs between three and five. If it do not occur previous to five, the horse will stand a fair chance to escape it for the remainder of his life.

The disease is characterized by a swelling or enlargement and inflammation of the glands situated under and to the inner side of the lower jaw, and called the *submaxillary glands*.

Symptoms.—In the earlier stage of the disease, the symptoms are much the same as in common cold; and, indeed, seems to be nothing else, and will yield, in the more mild cases, to the same treatment. The first symptom that will generally be noticed will be a very quick, short cough. The discharge from the nostrils will be found, on examination, to be greater than in common cough, and of a transparent and greenish-yellow color, and after awhile will be streaked with pus or matter; having no bad smell in the early stage, but, as the disease progresses, becoming quite offensive; and the worse the smell, the more favorably may the case be regarded. In a few days, or, in some cases, only a few hours, after the appearance of the discharge from the nose, the swelling of the glands between the jaws will commence, and increase more or less rapidly, until the breathing becomes very much affected. The swelling may become so great as to cause suffocation, especially if it should extend so high as to affect the opening into the windpipe. There is also considerable fever, and the discharge of a ropy fluid from the mouth. The expression is anxious and haggard. The horse can not eat well,

though he seems to desire food; he can drink but a swallow or two at a time. Often, in attempting to swallow, a spell of coughing will come on, and his life will seem in danger from strangulation; and from this circumstance the disease takes its name. The tumor is round and uniform, and increases until it fills the entire space between the jaws. After awhile, generally in from six to ten days, a soft place can be found in the middle of the tumor, indicating that matter, or pus, has formed, and has "come to a head." The tumor will soon break, discharging a large quantity of pus, and the horse gradually recovers. When matter forms, if it does not break, open it.

Strangles may be distinguished from glanders and common catarrh by its large, uniform swelling, and the knotted and smaller swelling of glanders and catarrh.

Causes.—Some young horses take the disease without any ascertainable provocation. It is generally taken after the animal has been exposed to such influences as usually give rise to cold. The condition of the weather seems to have much to do in developing it; it being more common in damp weather, and in the spring and fall, than in other seasons. There is much difference of opinion as to whether strangles is contagious. That it may originate from other causes there can be no doubt. But, aside from popular belief, there are very strong reasons for regarding the disease contagious. The most uniform law of contagious diseases is, that they protect the system from subsequent attacks. A horse that has once had strangles is never again attacked with it. When it occurs on a farm or in a stable, all the young horses that have not had it are almost certain to take it before it leaves the place. A mild form of the disease has been produced on the continent of Europe by inoculation, which is said to have prevented the animal from afterward taking the true disease. Hence I think we are warranted in regarding strangles contagious, or catching.

Another peculiarity of this disease is, that, if neglected or improperly treated, it may run into farcy, or glanders, or both;

first the one, and from it into the other. The following case will illustrate this: A mare, four years old, was attacked of strangles. She was treated for some time by a fellow who knew nothing of the character of the disease, but he eventually succeeded in getting the discharge stopped.; but, about eight months after, the nostrils again commenced discharging. He again stayed the progress of the malady; but, some ten months after, symptoms of farcy made their appearance, and soon the case was found to be one of confirmed farcy. At this time another quack got hold of her, and succeeded in abating the disease for a time; but, in six or eight months, she was found to have a genuine attack of glanders. I was, at this time, studying, and, thinking the case a good opportunity for experiment, I got possession of the mare. My tutor had become convinced that medicine, internally, was of no use, and resolved to try a different plan, which succeeded in the present case, notwithstanding the mare had infected her own colt, and it died, not being able to stand the medicine. This treatment has been successful in every case of farcy, and the first stage of glanders. I will give it to the public for the first time when treating of farcy. When strangles have been neglected or improperly treated, and are about to return in the form of glanders, in about six months after the attack, a discharge from the nose will be noticed, and small but hard enlargement of the glands under the jaw; and, if still neglected, a true case of glanders will be the result.

Treatment.—If this disease is early noticed, the same treatment appropriate for common cold may cure it, with the addition of a blister over the affected glands, as hereafter recommended. But it is safest to commence with the following vigorous treatment as soon as the case is well ascertained to be strangles. First commence by bleeding, taking about six quarts of blood. The object of this is to subdue the inflammation and reduce the fever. It is very important to prevent the affected glands from suppurating, or, in plain language, from

forming matter and coming to a head, which they have a great tendency to do. But if this can not be done, the next best thing to be done is to bring the swelling to a head as fast as possible. And, fortunately, the same thing that is the very best for the former purpose, if it does not accomplish it, is also the best for the latter. It is, to draw a good blister over the part affected. For this purpose

Take—Cantharides, (Spanish flies), pulverized ..2 ounces.

Tincture of cantharides 2 ounces.

Spirits of turpentine..... $\frac{1}{2}$ pint.

Mix, and let stand two hours, shaking it frequently.

Clip off the hair as close as possible from the throat, down between the jaws, below the swelling. Rub the blister in with the hand, using about one-third of the liquid the first time, and over all the space from the throat down between the jaws, and as wide as their under edges. Be sure to rub the liquid in thoroughly. The next day repeat the same process, regardless of any blisters that may have formed. After this, if the swelling seems to be going down, the application need not be repeated oftener than every second day; but, if not, every day until matter has formed, and come to a point. As soon as this occurs, which will be known by some part of the tumor becoming soft—generally the center, but sometimes to one side—*it must be opened*. Take a sharp-pointed knife; hold the blade firmly between the finger and thumb, and pass it quickly into the softened part of the tumor, deep enough to reach the matter or pus, and from an inch to an inch and a half wide, so that no pressing or squeezing will be required, which should never be done. To prevent the horse from tearing himself while the blistering is being done, he must be so tied that he can not rub his jaw against his leg, the manger, or stall. He should be blanketed from the start to keep him warm, and must be kept in a stall where he will have fresh air.

Internally give the following alterative:

Take—Red puccoon, (blood-root), powdered 2 ounces.
Gentian-root, powdered 2 ounces.
Sulphur 2 ounces.
Saltpeter, powdered 2 ounces.

Mix thoroughly together.

Give one tea-spoonful twice a day, in one pint of warm water, as a drench, until well.

GLANDERS.

This is, perhaps, the most fatal, as well as the most loathsome disease to which the horse is subject. It has been described by different writers for a period of over fifteen centuries, and has almost invariably been considered incurable. It is generally conceded to be produced by various causes; but, by whatever cause produced, its course is much the same. In treating of this malady I shall pursue my usual course; first explaining the symptoms, then the causes, and such other matters as are important to be understood in order to a perfect knowledge of the disease, and the principles upon which the treatment is based; and, lastly, giving the treatment which has proved most successful in my hands.

Symptoms.—The first symptom of glanders is a dry, but not staring appearance of the hair, it occasionally resuming its natural gloss for a time, and then again fading. The flesh diminishes, or wastes away rapidly, on dry feed, but will return again on bran, brewery, or distillery slops, or any soft, nutritious food; but this improvement will be only temporary, and the flesh again commences to waste; and eventually the hair becomes staring, and the horse exhibits indications of failing strength and vitality. These symptoms may continue for a longer or shorter time before any others make their appearance. The next and most characteristic symptom will be a discharge from the nostrils of a lighter and paler color than

that of common cold or gleet, and not so profuse, and of a more glutinous or sticky character. The discharge in cold or gleet is from both nostrils, and in considerable quantity, stopping for awhile and then commencing again; but in glanders it is continuous and scant, and generally affects but one nostril, and this, in more than nine cases in ten, is the left one. Of eight hundred cases examined by M. Dupuy, Director of the Veterinary School of Toulouse, only one was affected in the right nostril. The discharge is somewhat offensive, and the further advanced the case is, the more so it becomes. After the disease has progressed to what might be termed the second stage, the discharge from the nose will be streaked with pus or matter, and, on examination, the membrane of the nose will present a dark purple hue, or even a leaden color, widely differing from the pink blush of health, or the fiery red of fever or inflammation. Ulcers with raised, thick edges, round, and deep, will also be seen. The breathing now becomes more affected, generally with some cough. At this stage the glands under the jaw become affected; they are not largely swollen and inflamed, as in catarrh and other diseases affecting them, but small, hard, and near the jaw-bone, and having a tendency to become attached to the bone; and the nearer they get to it, the worse may the case be regarded, until they adhere to the bone, when the animal's days may be considered as nearly numbered. The glands affected are on the same side with the affected nostril and weak eye.

By this time, also, the horse will commence shedding his coat of hair, whatever the season of the year; and with it a great amount of dandruff; and yet the hair that remains will not look any the brighter. The belly will now begin to tuck up; the horse eats but little; an occasional cough is heard; his strength fails fast; the discharge from the nostrils becomes streaked with blood, and larger in quantity, and both nostrils discharge. But to this there are exceptions: small ulcers will appear on the outside of the nose, and the discharge becomes

extremely offensive, even stinking; and the hind-legs commence to swell, sometimes the swelling of one preceding that of the other a considerable time. These symptoms continue to become worse and worse until the powers of life give way, and death claims his long-contested victim.

Causes.—With regard to the causes of this disease I shall not greatly differ with writers generally, but I find myself widely departing from the opinion of some eminent authors as regards the nature and seat of the disease; and, as I am confident very injurious errors are inculcated on this subject, I must ask the reader's indulgence, as I shall be somewhat lengthy in treating of this subject.

The most frequent cause of glanders is, undoubtedly, bad feeding, and bad stable management, and exposures of the horse, by overworking, and surfeiting. The next is contagion, or infection. And, another way in which it is produced, is by the termination of certain other diseases, when neglected or improperly treated; and it is, as has been before remarked, intimately connected with farcy, being a natural termination of that disease.

The most common opinion of this disease is expressed in the following quotation from Mr. Youatt's work on the horse. He says:

"There can be no doubt that the membrane of the nose is the original seat of glanders; that the disease is for a time purely local; that the inflammation of the tubercles must proceed to suppuration before that matter is formed on which the poisoning of the constitution depends; that the whole circulation does at length become empoisoned; and that the horse is destroyed by the general irritation and disease produced."

How the distinguished author above quoted, with the accumulated evidence of centuries before him, should have come to such a conclusion, is strange. But, as I wish a fair discussion of the question, I shall state my objection to this position,

and then present what seems to me the true theory of this disease, or, at least, one supported by known facts.

If glanders is a *purely local* affection of the nose, how is it that the disease can be produced by inoculation in the heel of the hind-foot, or any other remote part of the system? Is the poison carried through the system to the nose, and there deposited, to return again and affect the constitution? Or does it find its way, like vermin, through the hair, on the outside? Again: if an affection of the membrane of the nose, in its first stage, why is it that it may remain in the form of farey, until the system is well-nigh destroyed, before any symptoms of true glanders are presented? And again, still, how can those cases be accounted for which go on to a fatal termination without any signs of the affection of the nose? I mean farey. And why is it that, long before any ulcers have formed in the nose, the constitutional derangement has progressed so far as to present unmistakable indications of the work of the destroying pestilence? And, lastly, why should bad food, surfeiting, exposures to foul weather, overworking, ill-ventilation, offensive gases, and the exhaustion consequent on other diseases, be expected to leave the general system, and take up their residence in the membrane of the nose, and from thence come forth to attack again and destroy the constitution of the animal? I most certainly reject this idea of the nature of glanders, as opposed to all the known phenomena of the disease. Indeed, if glanders is to be regarded as originally a local disease, I think it would not be difficult to show that the lungs have the advantage of the nose, in claiming the original seat of the disease.

I will simply present one argument in favor of the priority of the lungs. If horses are killed as soon as known to be glandered, ulceration will be found in the lungs, when the membrane of the nose has not reached this stage of the disease; and, at a later stage, the lungs present much greater ulceration than the nose does. From what has already been said,

the reader will doubtless have inferred my position as to the character of glanders. But, that I may be perfectly understood, I will state my views of the character of the disease as clearly as possible. I regard glanders as essentially a constitutional disease, produced by a specific poison, either introduced into the system by infection or inoculation, or generated in it by some peculiar and unusual chemical action, or by a perverted nutritive action; and that its generation is peculiar to the horse, and that this poison has a peculiar tendency to affect prominently the mucous surfaces of the lungs and air-passages, as well as certain excreting glandular structures of the system; and this is most likely, because nature endeavors to throw off the poison by these structures, thus peculiarly exposing them to its poisoning influence. This poison, or virus, seems to possess the character of a ferment. In this connection I shall quote from M. H. Bouley, in the "London Veterinarian," an article which may throw some light on the subject, corroborating the views above given. He says:

"I. That glanders is a spontaneous disease only with the horse species, it being, in other animals, always the result of contagion; that in the horse species it *may* be the result of contagion, but generally it is a product of disordered or perverted nutritive action in the system, and consequently is, in its origin, peculiar to the horse species.

"II. That this exclusive generative faculty is coincident with the exclusive uses to which horses are put; the horse being that vital machine which is employed for moving great weights, or overcoming great resistance.

"III. Oxen, in some localities are likewise so employed; but then they do their work always at a tardy pace, so slow, indeed, that it does not interfere with rumination, (chewing the food over, or chewing the cud); while horses, on the contrary, almost always work with more rapidity, and oftentimes are compelled to carry great weights at the same rapid pace.

And, moreover, the horse, nervous and excitable by nature, freely gives himself up to such rapid movements, expending, thereby, so much more strength, in any given time, than the bullock in his slow movements.

“IV. Excess of such kind of labor appears to be one of the causes of the horse’s *deterioration* and *wearing out*. And so glanders, viewed as the result of excessive action in the living organ, is nothing more, in a great number of cases, than the effects of exhaustion, induced by labor to which the powers of the animal were inadequate.

“V. But how does this excessive work produce exhaustion and premature wearing out of the machine? Modern science furnishes us with an answer to this question, of a more precise and satisfactory description than formerly could have been given.

“VI. Animal life is sustained through veritable combustion (burning). Pulmonary exhalation proves this. The air expired from the lungs contains the products of combustion—carbonic acid and water. The combustible matter entering into the constitution of the organism (or living body) is therein incessantly separated and eliminated (thrown out), through the agency of the affinity of the oxygen absorbed upon the pulmonary surface. It is the same with the incombustible matter—azote (or nitrogen): that being separated from its various combinations whenever the oxygen exerts its affinity, and becoming eliminated through the urinary passages.

“The effect of the air, then, introduced into the system through the respiratory passages, is incessantly to destroy organic combinations and eliminate their products, in a state of combustion (carbonic acid and water), through the lungs and skin. Those incombustible azotic matters, separated from the blood in the form of *urea*, pass through the urinary channels. The oxygen of the air is continually producing combustion and decomposition of the living animal fiber.

“VII. The action of combustion and decomposition is the more potent, the more the acts of respiration and circulation are accelerated, and the contact of the air with the blood becomes, in consequence, the oftener repeated.

“Work can not be performed without the acts of respiration and the pulsations of the heart becoming more energetic, and proportionally so with the speed and intensity of the work; the consequence of which is to bring the organic fiber often into the presence of oxygen, and so to hasten combustion and decomposition.

“Chemical analysis shows that the products of combustion, exhaled through the skin and lungs after a rapid course, are considerably augmented; consequently, decomposition becomes augmented under such circumstances. I pass over, in this estimate of the causes of wear and tear in the animal machine, the nervous exhaustion consequent on muscular contraction, because, although I attach great importance to them, in this discussion they are not necessary for my demonstration.

“VIII. The organism is opposed to this oxydation:

“1. By virtue of the innate force of cohesion existing between its component particles—a force which, for a certain time, is able to counteract the affinity resulting from the action of oxygen.

“2. And especially through the continually renewed influence of the aliments, introduced in sufficient quantity into the digestive apparatus for furnishing the living tissue with the elements proper for its reparation, and the oxygen of the air with combustible matters, fit for the development and completion of its affinities, and, through combination with it, for the production of the required animal heat.

“IX. But if, while we are exacting continually from the animal machine a large demand of strength—which, as I said before, entails the introduction of a considerable quantity of atmospheric air into the air passages—we do not afford a sufficient supply of alimentary substance—that is to say, of

azotic and combustible matters—the oxygen may exert its affinities on the matter actually composing the organs themselves, determining a rapid decomposition, and finally producing, with the azotic matter, a new principle, endowed with powerful novel affinities, expediting, by its presence, the decomposition of the organism, and discovering itself, during life, by that cohort of symptoms and derangements which characterize glanders.

“This active principle, the result of extreme *oxydation* of the system, analogous in its origin and progress to *ferments*, is glandered virus. I am, indeed, struck with the analogy existing between the mode of generation of glandered ferment in the living body, under the influence of the oxygen of the air, and ferments which are concocted without vitality, through the affinities of the same gas.

* * * “Now, may we not admit that, in the vital organism, azotic matter, continually coming into contact with the oxygen of the air, may become converted into a peculiar ferment, the same as we behold in the dead body, the organic substance turning into putrid ferment, through the combined action of air and water, and moderate heat? There is an approximation here which has something specious about it.

“Once produced, in whatever way it may be generated, glandered ferment is certainly accompanied by ulterior phenomena in the system which bear the closest analogy to those of recognized fermentation. Placed in contact with matter capable of feeding it, the glandered principle assimilates it, and greatly hastens the organic decompositions. In fact, chemical analysis seems to demonstrate that the exhalation of carbonic acid is much more considerable in an animal under the influence of glandered fermentation, than, if I may be allowed the expression, in an animal in health. Such is the theory; let us now consider the facts.

“X. Experience has shown, and every day still shows, that incessant work, without rest, such as is exacted of horses in

certain undertakings, is one of the most frequent causes of glanders, acute and chronic; but principally of acute. No discussion, I should imagine, will arise on this point, it being an acknowledged fact, set forth every year in the *Comptes Rendus* (or Annual Publication) of the Atfort school.

"It is no less certain that, in the greatest number of cases, whenever a horse becomes glandered from overwork, it falls greatly off in condition before the disease makes its appearance—a fact which accords with the great exhalation of carbonic acid and water, the fatal consequences of the activity of the respiratory and circulatory functions.

"On the other hand, whenever glanders has declared itself, the horse rapidly falls off—he becomes a *dog-horse*—and this disappearance of his fat corresponds with the augmented exhalation of carbonic acid, which becomes remarkable at the period of eruptive and acute glanders.

"Another fact is, that the influence of excessive work may be counteracted, and even rendered harmless, by a large reparative alimentation. Demonstrative experience of this passed under our own eyes, on a very extensive scale, too, on the occasion of the construction of the fortifications of Paris. The horses worked hard in draught became glandered, or not, according as they belonged to masters who could afford to (and did) keep them well, or not. Most of the glandered horses were the property of unfortunate piece-workers, knowing little of the management of horses, and too parsimonious of their feed; while, on the other hand, the disease spared such as were well fed, by wealthy contractors, undertaking the work on their own account.

"XI. The laboring ox is not subject, on account of being worked up, to any disease having the least analogy to glanders. Not to notice his difference of organization, which is a principal consideration in this question, I contend that the difference of results from the same cause in the bullock and the horse is owing to the modes of using them; to the con-

stant slowness of pace of the one, and the occasional and frequent rapidity of that of the other. This difference may cease to exist whenever the ox is forced into quick work, and, especially, should he be fat at the time. In such condition, under the influence of hurried respiration, oxydation of the combustible elements takes place with so great rapidity that the exhalation of the carbonic acid product can not get vent with sufficient celerity, and the consequence is, the animal dies asphyxiated or *carbonneux*. In this case, a new principle, *a ferment*, becomes generated in the blood, under the influence of extreme *oxydation*.

“XII. I am not to be supposed to admit that, in every case, glanders is the result of *extreme oxydation*. I reserve this interpretation for one cause alone of the disease, viz.: overwork.”

The above lengthy extract may puzzle some, on account of the scientific terms found in it; but I have not taken the liberty of changing the author's language to the simple style of my work. I have, however, put in a few explanatory words, and by the aid of these, and by first reading the article on respiration, any one, it is hoped, may be able to understand the above quotation. Physicians sometimes contract a disease when dissecting dead bodies, which is produced in the following way: The process of decomposition going on in the dead body gives rise to a peculiar ferment; and this is so subtle, that when the finger is cut by the knife used in dissecting, some of the poison is left in the wound, and is carried into the system through the blood, and, acting as a ferment, induces a similar process in the living body to that going on in the dead one. This is called *septic poison*. This affection in the human patient bears many striking resemblances to glanders in the horse. Considerable danger attends the handling of the glandered horse, for a person may contract the disease by inoculation; so may other animals. I knew

a gentleman who purchased a mare, and when riding her to town, a few days after, he perceived a little mucus about the nose; he got down, and pulled some grass to wipe it off; and, in pulling the grass, got pricked by a thistle, and the virus from the nose coming in contact with this slight puncture, inoculated his system, and he died a miserable death, of glanders. The servant girl who waited on him also became infected, and died. A doctor, in the same vicinity, a few years before, had a glandered horse. He took him to the veterinarian with whom I studied, for treatment. But he told the doctor the case was one of confirmed glanders, and that he would have nothing to do with it, telling him he would as lief handle a mad dog. The doctor then persuaded him to give him the medicine, and he would give it himself. He did so. But the doctor got his finger cut by the horse's teeth, took the disease, and died. I also knew a poor man to contract the disease by skinning an ass that died of farcy. He showed both symptoms of glanders and farcy. His flesh would not cleave to the bones after death. The disease is much more rapid in the human than in the horse. The cases I knew of did not live over ten or fifteen days.

Treatment.—As the treatment is the great object for which all our trouble, in searching out the nature, causes, and symptoms of disease, is taken, we might hope to present something more satisfactory in the treatment of glanders than we find ourselves able to do. This is the *opprobrium* of the veterinary profession. And, though we are confident that a step in the right direction has been taken, in regarding glanders as, from the first, a constitutional disease, thereby directing efforts to cure it to the general system, instead of vainly endeavoring to remove it by operating on the nose, we can, as yet, give but little encouragement as to the treatment, in the later stage of the disease. But I must put in a plea for the unfortunate animal, that he be not too hastily “condemned to the bone-yard,” but given a chance for his life, in the use of the measures here-

after directed. Nevertheless, as "prevention is better than cure," and, especially in this disease, furnishes "a surer foundation of hope," I shall discuss pretty fully the precautionary measures necessary to its

Prevention.—As bad stable management is one of the most fruitful causes of the disease, it will be proper to first call attention to this subject. The stable should be constructed on the principles laid down in the article on "stables," in another part of this work; so as to admit at all times a proper amount of fresh, pure air, without which neither man nor beast can be healthy. To show how important it is to avoid crowding horses together in close apartments, I will give an incident related by Professor Coleman, of England:

"In the expedition to Quiberon, the horses had not long been on board the transports when it became necessary to shut down the hatchways; the consequence of this was, that some of them were suffocated, and all the rest were disembarked either glandered or farcied."

The gases generated by decomposing or rotting manure and urine poison the air, and render it unfit for the horse to breathe. These gases contain hartshorn or ammonia, and their long-continued action on the lungs will give rise to glanders. Hence the stable should be so constructed as to allow the urine to pass away from under the horse, and the dung should always be removed from the stall every morning. In short, the stable must be kept clean and sweet. The feed of the horse must always be such as will keep him in good condition, and especially when at work. And should he be found to be getting low, he should be allowed his freedom, with good feed, for a time.

Long-continued overwork should not be imposed on any animal; but this may best be compensated by careful grooming, stabling, and good, nourishing feed, in liberal quantity.

As glanders is an infectious disease, well horses should be kept from the infected ones: too much care can not be given to

this precaution. The glandered animal should be kept far from all others, and where he can have, as far as possible, his natural freedom, but not to be exposed to the severities of the weather.

Remedial Treatment.—Blanket warm; place him where he can have pure air; rub him well twice per day; give the most nutritive food in mash form; the more sweet milk the better: soft or rain water for his drink, with two tea-spoonfuls of elixir of vitriol to the common bucketful; take flax-seed, one-half peck at a time, to eight or ten quarts of water, or that proportion of what you wish to make at a time, steep the seed, over night, next morning boil till when cool it forms a thick jelly; keep well stirred in cooking, or it will burn; then prepare the following medicines:

Crude niter	1 ounce.
Carbonate of iron.....	2 ounces.
Phosphate of lime	2 ounces.
Ground sarsaparilla	8 ounces.
Ground sassafras.....	8 ounces.
Asafoetida	2 ounces.

Mix, and give one ounce twice per day in his feed, with one tea-cupful of the flax-seed jelly, and pyroligneous acid, one ounce; the above morning and evening; the third dose say in the middle of the day.

Take—Spanish flies	1 dram.
Blue vitriol.....	2 drams.
Powdered iodine	1 dram.
Ground ginger	8 ounces.
Capsicum (red pepper).....	6 ounces.

Mix, and give one ounce, and one tea-cupful of the jelly, in his feed, once per day. If he should entirely refuse to use the medicines in his feed, stop his hay, and hunger will force him. The larger the mash, the less the medicines will taste. If nothing will induce him to eat it, the objectionable dose must be given in a drench, or sweetened with molasses, honey, or such. If ulcers are formed in the nostrils, or if not, the lungs will benefit by the following being inhaled:

Take—Tannin	4 grains.
Sulphate of zinc.....	4 grains.
Sugar of lead.....	20 grains.
Laudanum	2 grains.
Olive oil.....	2 ounces.

Mix. Take a large goose-quill, bore the barrel, run a string or whang through, dip it in the above, and put it up the nostrils; tie the cord to the halter at the side or front; leave it there till evening; if in the evening, till next day, and so continue dipping it twice per day in the above. Rub the glands twice per day with tincture of iodine.

If these should succeed in stopping the disease, which is easily known by the glands dispersing or lessening, the discharge entirely ceasing, give the following. Be certain that the disease is conquered, then

Take—Ginger	4 ounces.
Black antimony	2 ounces.
Sulphur	2 ounces.
Niter	2 ounces.
Resin	2 ounces.

Mix, and give one tea-spoonful twice per day in feed. This is to improve his strength and condition.

FARCY.

As before remarked, farcy is intimately related to glanders; is sometimes called a twin sister; is, perhaps, identically the same disease in a different form, depending upon the same cause. It develops itself in the form of an affection of the lymphatic vessels, which are described in the chapter on the lymphatics, in another part of this book. As I said of glanders, so do I say of farcy, "that it is a constitutional disease, poisoning the whole system."

Symptoms.—Farcy is sometimes slow in its approach, but, in some cases, comes on quite suddenly. Most generally the horse exhibits certain symptoms indicative of approaching disease. He will be found, for greater or less time, off his feed, or not eating with his usual appetite, dull and indisposed to action, the hair becoming dry and staring, and dark in appearance; he falls off in flesh and loses condition, and sometimes symptoms of fever will be observed at this stage. If the horse is on grass, he will be observed to stand by the fence or under

the shade of a tree, evidently seeking shelter. If in the stable, he will stand at the full length of the halter. Whether running out, or in the stable, an unusual quantity of dandruff is thrown off, and the hair comes off easy. The horse becomes stiff in his movements, and mucus sometimes appears to gather in the inner corner of one or both eyes. When these symptoms are observed, mischief may be expected, and a careful look-out kept for the characteristic or unmistakable signs of farcy. These are the peculiar knotted character of the lymphatic vessels along the course of the veins, and which are aptly described as "*like a cord with so many knots tied in it.*" These will best be found and examined on the inside of the hind-leg or thigh, accompanying the course of the large vein, called *the femoral veins*. Both thighs should be examined, lest one might not be affected. By following this knotted cord on up to where the thigh joins the body, (the groin), the large gland (the inguinal gland) there situated will be found swollen. *Farcy-buds* or buttons now make their appearance along the side, under the belly, and along the back of the forearm, and about the face and neck. These *buds* are about the size of a five-cent piece in diameter, perfectly round, the edge falling off abruptly; and, from the thickness of the edge, appear as if not attached to the flesh; they raise to the height of about half an inch, and have a small, nearly flat top.

After awhile these *buds* increase in number, many times forming clusters; some of them begin to become hot and tender, and soon ulcerate, discharging a thin, bloody matter. This ulceration of the *buds* marks the beginning of the

Second stage of the disease. Commencing, then, with the ulceration of the buds, all the former symptoms become aggravated. These ulcers continue to discharge and burrow deeper in the flesh. The large glands in the groins, which were swollen before, now form large, deep, eating ulcers; others of a similar character appear between the fore-legs; and one or both hind-legs swell, occasionally, to an enormous size, or the head

may become largely swollen, but more commonly one side of the nose. The animal becomes a loathsome, miserable object, and may die from exhaustion at this stage. But this is not generally the case. Another train of symptoms,

The third stage, occurs, and we have a case of glanders in its last and incurable stage; and the disease continues its onward progress until the final work of death is accomplished.

But farcy does not always pursue this regular course of symptoms. Its attack is sometimes ushered in by very puzzling symptoms; and so, also, do very different symptoms occasionally take place during the progress of the disease.

Sometimes the horse will be attacked with a sudden lameness in one hind-foot; can hardly carry it along; and the owner will think his horse must have been exposed to accident or hard treatment. He examines the hip, the hough, the stifle, the fetlock, and the foot; perhaps goes to a blacksmith and has the hoof tried. And while this search is going on, the horse may get well, or apparently so, at least, and keep so for a few days, or even weeks; and then, suddenly, and unobserved, or in one night, one of the legs, more frequently the hind-leg, swells to two or three times its natural size; and, on examination, the knotted cord or the farcy-buds will be found, and the case remains no longer in the dark.

Occasionally the head, and more particularly the muzzle, will be the seat of enormous swelling, accompanied with an offensive discharge from the nose. In other cases the horse becomes "hide-bound," with loss of strength and flesh; patches, of the appearance of mange, are distributed over the skin; the legs swell, and cracks about the heels occur. Care must be taken not to confound this appearance of the disease with "grease-heel," which might be done, by a careless examination.

Occasionally, after the buds have formed, they become hard and difficult to disperse; do not ulcerate; the horse remaining for many months apparently well of the disease. But the

poison is still in the system, and will break out in a violent form, and soon destroy him.

Causes.—From what has already been said of this disease, the reader will have expected to find the same causes operating to produce it that are known to cause glanders—and such we find to be the fact—surfeiting, filthy stabling, overwork, and infection. Inoculation with the matter of glanders will produce farcy, and with that of farcy will produce glanders. Hence, it seems unavoidable to conclude that, if glanders is the result of a particular poison, farcy is the consequence of the same poison operating under modified circumstances. Why this virus should, in the one case, first attack the mucous membrane lining the air-passages, and in the other the lymphatic vessels and glands, I know no satisfactory explanation. Yet the fact is not at all inconsistent with well-known phenomena of disease in the human family, as well as in the lower animals. Two persons may be exposed to the miasm of a damp situation, where animal and vegetable substances are decaying, and the one be attacked of typhoid fever, and the other of dysentery or flux. Two horses may be exposed, in the same team, to a hard drive, rain, and cold, and the one take inflammation of the lungs, and the other pleurisy.

The older writers describe two varieties of farcy—button farcy, the one we have described, and water farcy. But the latter is now known to be of an entirely different character from true farcy, being a *diffuse inflammation of the cellular membrane*. No difficulty need be experienced in distinguishing between the two diseases. In the latter disease the swelling is in larger lumps, which appear very suddenly, and is attended by puffy swelling of the limbs, along the belly, etc. There are no knotted cords, nor the small buds, to be found. Farcy may be distinguished from surfeit-lumps, which are large and irregular in form, and of short continuance; sometimes subsiding or going away in a few hours, though oftener remaining some time. (See *Surfeit*). To conclude my remarks on the distinguishing of

farcy from other ailments, I shall quote from an eminent veterinary surgeon, who says :

“No swelling of a hind limb, or any other part, constitutes a case of farcy apart from the unequivocal signs of *lymphatic* disease. There must be present corded, nodulated swellings—*buds*, in some form or other—together with actual or approaching tumefaction of the lymphatic glands, or the case is not farcy.”

Treatment.—The same measures recommended for preventing the liability to glanders should be observed to avoid farcy. Care should always be taken not to let well horses come in contact with an affected one; and when there is danger of the disease being contracted, as when it has occurred in a stable or on a farm, or when on a journey, a piece of asafœtida may be wrapped in a bit of cloth and nailed in the bottom of the trough of each horse, or in the watering-bucket, or tied around the bridle-bit. The trough or manger in which a glandered or farcied horse has been fed should be thoroughly cleansed and washed with a solution of chloride of lime, prepared as follows :

Take—Chloride of lime.....1 pound.

Water 1 bucketful.

Dissolve the lime in the water, and wash every place where the matter or pus may have lodged. This should always be done before putting another horse in the same stall or stable; but first scour.

As it is impossible to tell certainly that a case is farcy until the “knotted cords” before described, or the buttons, have made their appearance, all that can properly be done at this stage will be to put the horse out of work, and, if in summer, on grass, and where he can have the benefit of pure air, and not be exposed to foul weather.

But when the buds have come out, the case is no longer in doubt, and must be promptly and perseveringly treated. Though I don’t bleed, it is good practice for the farmers, it being the quickest. The first measure will be to *bleed* the patient

from *twelve* to *sixteen quarts*, or until he perceptibly shows signs of the effect. The benefit resulting from the bleeding is not so much in removing any impurities by the quantity of blood taken, as in the shock given to the system, whereby those organs—the skin, the lungs, the kidneys, the liver, etc., part of whose office it is to remove from the system offending matters—are aroused to a more vigorous action, and thus very greatly assisting in removing the poison producing the disease from the system.

Medical Treatment.—Use the same medical treatment as in glanders, (which see); and, after the buds or button-like tumors break, anoint them with the medicine applied in the nostrils. If the legs are swollen, physic with aloes; to one pint of warm water add Barbadoes aloes, one ounce; ginger, one-quarter ounce. Drench.

New Treatment for Inveterate Farcy.—Viz:

Take—Yarrow leaves	1 ounce.
Yellow dock	1 ounce.
Garlic	1 ounce.
Salt	$\frac{1}{2}$ ounce.
Tobacco	$\frac{1}{2}$ ounce.

Chop fine and mix.

Take the horse's left ear and lay it down along and over the jugular vein; cut the skin over the vein where the blunt turn of the inner edge of the ear reaches; part the skin from the muscle under, forming a pouch or pocket; fill this pouch with the herbs, etc., as above directed, to the amount of at least two ounces; leave it in exactly twelve hours, no more, nor less; if left in thirteen hours, it will kill the animal. After the twelve hours, take the mass out and wash it out while the water shows any green color; then insert a plug made of the fat of the oldest smoked bacon you can procure. Be very sure to not plug too tight, but leave room for matter to escape. Take out the bacon once every day, force out the pus, (matter), and return the bacon; renew the bacon when it gets too small or reduced,

and continue till the skin rots over the pouch ; then keep the animal from scratching, lest he tears the jugular vein.

MANGE.

Mange is a very highly infectious or catching disease, which attacks the horse's skin, in the form of a pimpled eruption, or breaking-out—the skin on the parts affected soon becoming stripped of hair, and of a rough, puckered, scurfy appearance, and which has no tendency to get well of itself, in any case, but goes on from bad to worse, and which reduces the animal to the most loathsome object, when, finally, he dies.

Symptoms.—The first appearance of mange is generally on the upper part of the neck, at the roots of the mane. Small pimples may be observed, which soon break ; the parts become very itchy ; the hair loosens and falls off ; the skin becomes thick, and covered with patches of thick scurf, like those in a bad case of surfeit ; in some cases a watery fluid oozes out, and a scab forms, which, after awhile, puts off, leaving a large, rough, scaly spot. In the mean time, these blotches or scabs are spreading along the back and down the breast ; the skin loses its softness and elasticity, and becomes puckered or gathered into folds, resembling very much the hide of the elephant. One prominent symptom from the beginning is itching. It is often the first symptom to be observed, and becomes so distressing, that the horse rubs and bites himself in the wildest fury.

The general health of the horse gradually gives way ; he loses his flesh, and becomes drooping ; the hair over the parts not affected becomes staring, and the animal finally dies from exhaustion and continued suffering. He may die in a few months, or may linger for many months.

Causes.—That mange is a highly contagious or catching disease does not admit of a doubt. It is as much so as itch is in the human family. Some veterinary surgeons regard mange in the horse, and itch in the human, as the same disease. It is attributed to little insects or mites, called *acari*, which get into

the skin, and which increase very fast, and spread over the horse. These mites are too small to be seen by the naked eye. Many millions of them may inhabit a few inches square on the horse's skin. It is by these little insects getting from a horse having mange to a healthy one that the disease is catching, just as one person catches the itch from another. If the same curry-comb, brush, blanket, saddle, bridle, or harness, which have been used on a horse having mange, be used on another horse, he will almost certainly take the disease. If a horse having it is kept in the same stable or the same pasture with other horses, they will all be likely to become infected; so, if put in the same stall where an infected animal has been kept, the disease will be taken.

Mange occurs, also, in the cow and the dog, and may be communicated from either to the horse. On this there is difference of opinion; but the safe plan is to keep the mangy cow or dog entirely away from horses, for in this course there is no risk.

Other causes than contagion are assigned as producing mange, and it is quite certain that they may. Starvation and exposure are capable of producing the greatest derangement of the horse's skin, and may give rise to mange, as they certainly do to hide-bound and surfeit. Filthiness in stable management is put down as a cause of this loathsome disease, but is not at all so likely to produce it as some other affections. It may aggravate the disease, when once started, or hasten its approach when the horse is starved and poverty-stricken. The derangement of the stomach and digestive organs, which results from starvation and poverty, are peculiarly calculated to produce disease of the skin from the natural sympathy between them.

A neglected or badly-treated surfeit may degenerate or run into mange.

Mange may be known from surfeit by the loosening of the short hair along the roots of the mane, or by a kernel, or hard lump, which may be felt in the loose flesh in the flank, which is not found in surfeit.

Lousiness need not be mistaken for mange, for a careful examination will discover the lice.

Treatment.—The internal treatment should consist of such alteratives as have a particular effect on the skin. The first of these, in my estimation, is the *flax-seed jelly*. It should be given daily, at each feed. The following should also be given :

Take—Sulphur.....	3 ounces.
Cream of tartar.....	3 ounces.
Powdered sassafras.....	3 ounces.
Powdered May-apple root.....	3 ounces.

Mix, and divide in ten parts. One to be given in the feed, night and morning.

As an external application or ointment :

Take—Pyroligneous acid.....	4 ounces.
Flowers of sulphur.....	4 ounces.
Calomel.....	60 grains.
Red precipitate.....	40 grains.
Spirits of turpentine.....	1½ ounces.
Lard.....	4 ounces.

Mix thoroughly, to form an ointment.

Rub this on every part of the body showing any signs of the disease, once a day. Rub it on thoroughly; but, before the first application of the ointment; wash the affected parts with lime-water, rubbing well. This is made by putting a lump of unslacked lime, as large as the two fists, in a bucket of water, and shaking it occasionally, and then letting it settle. The water is then to be shired off for use. Any rough, hard, scaly part should be scraped with a piece of hoop-iron, to remove the hardened scales, before using the ointment.

DISEASES OF THE DIGESTIVE ORGANS.

INDIGESTION.

THERE is no disease more common among horses than indigestion. It is more generally known in human practice by the name of dyspepsia. It is a disease, in both man and horse, much more frequently met with in America than in Europe. It is the foundation of many other and more alarming diseases that afflict the horse, among which may be mentioned flatulent colic, spasmodic colic, inflammation of the stomach, bowels, liver, etc.; and yet it is a disease generally overlooked by the owner, and often by the professional horse doctor. It is true, its symptoms may be so trifling in the early stage of the disease as not to be noticed; but I would earnestly recommend that more attention be paid to it, that its evil effects may be better understood and guarded against.

Symptoms.—A very considerable variety of symptoms manifest themselves in a case of indigestion, so the same train must not be looked for in every case. The appetite is irregular; the horse will eat with his usual relish for a few meals, and then seem to get a disgust for food, and take but little, or none at all; or eat every particle of certain parts of the feed, and leave other parts untouched. His unnatural appetite is observed in his eating dirt, dry sticks, pieces of brick, and, especially, the dirty straw of his litter, for which he seems, at times, to have a great relish. His bowels become more or less affected. The dung is passed in hard masses, and often much undigested grain in it, and covered with slime. Worms are a common attendant of indigestion. The dung has a very offensive smell, as also the wind the horse often passes. The smell of the manure is like that of rotten, fermented vegetables; and often the horse's stall is as disagreeable and stinking as a sink or hog-pen. Soon after the commencement of the disease the coat begins to appear rough and dry. The skin is cov-

ered with dandruff, and the hide is tight over the body. The flesh becomes dried up, and the horse can not improve, even though his appetite may be perfectly greedy, as it often is. The breath early becomes offensive, or even stinking, and the mouth and teeth very foul.

A dry, harsh, tearing cough will be present from almost the first, which is very severe after the horse takes a big feed, and especially if it has been a feed of the dirty litter of his stall. His spirits are stubborn and disagreeable, and he performs his labor with reluctance. The urine (or water) is changeable in its appearance, but generally thick and offensive.

Causes.—Half starving, and then stuffing and gorging the horse, to bring him up quick; heavy feeding when going to hard work; allowing him to drink largely of cold water after feeding; too stimulating food; bad ventilation and exposure, are all fruitful causes of indigestion. Unwholesome feed, as musty shorts, hay, and rotten corn, are very injurious to the horse's stomach.

Treatment.—There is no disease in which it is more important to ascertain the cause which produced it than indigestion. If the cause can be ascertained, and the horse is still under its influence, the cause must be removed. If the horse is a foul feeder, of course he must be prevented from his evil habits. He must, in all cases, be kept in a clean place, and have pure air. The quantity of feed each particular patient will require must be ascertained by allowing it a reasonable quantity, and increasing it by little, until the amount required is found. Green feed is the best; but boiled oats, chopped corn boiled, boiled hay, and the juice drank, are good. He should not be allowed much water, and that should not be given near mealtime. No water should be allowed for an hour before and an hour after feeding.

Internally, the following, to restore the tone of the digestive organs, may be given:

Take—Powdered asafetida.....	2 ounces.
Powdered capsicum, (red pepper).....	4 drams.
Powdered golden-seal	4 ounces.
Powdered sassafras bark.....	8 ounces.
Powdered sulphate of iron.....	2 ounces.
Shorts.....	2 pounds.

Mix, and give it in doses of two table-spoonfuls, in the feed, once a day.

Put a poplar pole in the stall for him to gnaw at. Give him the "*flax-seed jelly*," as directed when describing that remedy. If the cough should prove troublesome, give one of the remedies recommended in chronic cough. The horse should have plenty of salt.

FLATULENT COLIC.

There are two different kinds of colic to which the horse is liable, and which are generally treated of by authors under the one name of *colic*. It is true that some of the symptoms are very much alike, and even those of some experience may not at all times be able to immediately determine which kind of colic the case belongs to. The names by which the different kinds of colic are known are flatulent or windy colic, and spasmodic colic. The term *gripes* is used by some as a name for all kinds of colic. So, when you hear it said a horse has gripes, you know it is meant he has colic.

Flatulent or windy colic is by far the more frequent. It is a very distressing disease, and runs its course in a few hours, the horse either getting well or dying. It occurs most frequently during those seasons of the year that the horse is worked and fed on green food.

Symptoms.—The attack of flatulent colic generally comes on very suddenly. The horse becomes restless or uneasy, commences pawing, and shows other signs of pain. The pain becomes more severe; he looks around at his side, walks about anxiously, lies down carefully, rolls, showing an effort to keep on his back; gets up carefully, walks around as if in search of

something to eat, and may for a little time appear as if much easier. But the paroxysm is presently renewed, and he behaves as before, the pain evidently becoming more severe. Very soon after the commencement of the attack, swelling of the abdomen or belly will be noticed; this is caused by the gas or wind which is collecting in the bowels, and the presence of which is the cause of the suffering. The belly will be found tight, and will give a hollow sound if thumped or rubbed by the hand. The feel and sound thus presented are very different from the healthy softness of the belly, and its less hollow sound. The swelling increases; sometimes the swelling will be so great that it would seem as if the hide were stretched to its utmost capacity. The horse sweats freely, and groans with pain. His breathing becomes difficult, and belching finally commences. He ceases to lie down, as if fearing his ability to rise again. His pulse, which was but little disturbed, becomes quick and rapid. The fundament (and, if a mare, the bearing) protrudes or pouches out; the tail is more raised, the gait becomes staggering, often to one side, and finally, the horse falls, to rise no more—generally dies in thirty seconds or less.

Such is the ordinary course of a fatal case of flatulent colic. But it is not necessarily a fatal disease. Milder cases sometimes get well without any treatment; and the worst cases, taken early, will very seldom, if ever, prove fatal under proper treatment.

When a case commences to get better, the symptoms before described gradually commence to disappear. Particularly will the swelling of the abdomen commence to go down. The paroxysms or spells of pain become less severe, and longer between them. The horse commences to feed, and, in a short time, becomes quite comfortable. The disappearance of the disease is often as sudden as its attack.

Causes, etc.—The cause of colic is the formation of a large quantity of gas in the stomach or bowels, which, distending or swelling them beyond their natural size, and interfering with

their natural action, gives rise to great pain. This gas is mostly carbonic-acid gas. It is not "wind," but is like it in some respects.

But what causes these gases to be formed in the horse's stomach, is a very proper inquiry. This being known, much may be done to prevent horses taking colic.

Indigestion is the great cause of colic. Food is taken into the stomach which does not digest properly, but remains for some time, and undergoes fermentation, and in this process large quantities of gas are formed, and colic is the result. As fermentation progresses, more gas is formed, the colic becomes worse and worse, until suffocation and death take place. The attack may be produced by the horse eating largely of green grass, especially clover, green corn, etc.; and it will be more likely to come on if the horse is allowed to drink after eating green food, and particularly if he is being worked or ridden. A drink of cold water, or of limestone water, will frequently bring on an attack of flatulent colic in horses whose digestion is not good. But in such horses the attack may come on after any kind of food, and often without any observable cause.

Flatulent colic may be mistaken for spasmodic colic, and for inflammation of the bowels. In flatulent colic the swelling of the belly commences very soon, and becomes very great, and the spells of pain are close together, the intermission not being very perfect. In spasmodic colic the intermission or relief between the spells of cramping is more perfect, and there is but little swelling of the belly. The horse moves quicker in getting up and lying down than he does in flatulent colic.

The table on the following page shows the symptoms by which to tell colic from inflammation of the bowels.

In Colic.

The attack comes on very sudden.
 Spells of severe pain, and then rest, or ease from pain.
 Motion seems to give relief.
 Pulse not much different from health.
 Legs and ears naturally warm.
 Belly will bear rubbing, and it seems to give ease.
 Strength but little affected.

In Inflammation of the Bowels.

The attack is gradual, with symptoms of fever.
 Pain constant, and gradually increasing.
 Motion increases the pain.
 Pulse very fast, and often scarcely perceptible.
 Legs and ears cold.
 Belly very tender; will hardly bear to be touched.
 Gets weak very fast.

I have said nothing in this place about colic being mistaken for bots. Nothing is more common than this fatal mistake. How many thousands of horses with colic have been drenched with milk and molasses for bots! Hardly a case of colic occurs in the country but some fellow argues that it is bots. And what is the consequence of this throwing milk and molasses into the colicky stomach? It is adding fuel to the flame; it is like pouring oil on fire to put it out. No articles ferment quicker, nor give off more gas, than milk and molasses. They can not but do harm. But when it is remembered that there is no such disease as one caused by bots, no sensible person will allow his horse to be drenched with the various stuffs that are given to kill them, or make them let go.

Treatment.—In flatulent colic two objects are to be accomplished: the cramping or griping pain is to be relieved, and the further formation of gas prevented. As soon as it can be obtained, the following should be given:

Take—Tincture of prickly-ash berries.....4 ounces.

Whisky.....1 pint.

Warm water..... $\frac{1}{2}$ pint.

Mix, and give as a drench.

Then, as soon as it can be obtained, give the following:

Take—Tincture of opium.....1 ounce.
 Spirits of camphor.....1 ounce.
 Sulphuric ether.....2 ounces.
 Chloride of lime.....1 ounce.
 Water, milk-warm.....1 pint.

Mix, and give as a drench.

Blanket the horse well, and give a little walking exercise.
 If the case is very bad, give the following injection :

Take—German soap, shaved..... $\frac{1}{2}$ pound.
 Tobacco.....1 ounce.
 Salt.....4 ounces.
 Hot water.....2 gallons.

Mix until the soap is dissolved. Then take out the tobacco leaves, and inject the liquid into the rectum.

If the horse is not better in one hour after taking the second dose recommended, repeat it, leaving out the tincture of opium, and adding one ounce of the tincture of capsicum. After the first dose, give half an ounce of the chloride of lime. This may be given every hour until the horse is well.

If the tincture of prickly-ash berries can not be obtained, the following may be used in its place, to commence the treatment :

Take—Oil of cajeput.....2 drams.
 Oil of cloves.....2 drams.
 Oil of peppermint.....2 drams.
 Oil of anise.....2 drams.
 Alcohol.....1 ounce.

Mix, and give one table-spoonful in half a pint of whisky.

This I regard as one of the best remedies in flatulent colic. It would do well to follow up the dose of the second prescription recommended by this, adding to each dose three or four ounces of the tincture of prickly-ash berries, if it can be obtained readily.

SPASMODIC COLIC.

Most writers have described all kinds of colic under the one general name of *colic*. This is wrong. Flatulent or windy

colic, and spasmodic or cramp colic, are quite different in their character, and require very different treatment. Spasmodic colic is a disease of the bowels, characterized by frequent and repeated spells of violent cramping. It occurs more frequently in the warmer seasons, but may be met with at any time. But a very small portion of the gut may be attacked by the cramping, or it may extend along a large portion of it. The twisting and turning may be quite light, or of the most powerful character. After death, portions of the guts have been found very strangely twisted and contracted, or drawn in. The gut called the ilium is the usual seat of the disease.

Symptoms.—Spasmodic colic, like windy colic, is sudden in its attack, and no previous symptoms give warning of its approach. As in windy colic, the horse commences pawing, striking his belly with his feet; looks round at his side, and soon lies down. In spasmodic colic, he lies down very quick, and gathers his legs under, as if he wished to come down flat on the belly. He rolls rapidly, and does not seem disposed to lie on his back, but rolls clear over. He gets partly up, and sits on his rump like a dog, and looks round at his side for a few seconds; rises up quickly, and may even shake himself, and appear perfectly easy, and go to picking hay or grass, as if nothing were the matter. But, in a short time, he again begins to show signs of uneasiness, and the paroxysm is again renewed, the horse behaving as before described. But each successive spell becomes more severe. The horse sweats freely, the sweating commencing earlier in the attack in this than in windy colic. Another symptom which I have often observed in this variety of colic is, that the horse frequently turns up his upper lip. This is often thought to be a "*sure sign of bots*;" a very fatal mistake. There is but little swelling of the bowels in spasmodic colic, and, consequently, no great tightness of the belly, as in windy colic. After the disease has nearly run its course, and inflammation of the bowels, which is generally the result of spasmodic colic, has set in, there will be some degree

of swelling, but far less than in windy colic. The absence of swelling of the belly, in this kind of colic, is often thought to be clear evidence that it is a case of *bots*. Avoid this miserable humbug of bots.

As the case progresses, the symptoms above described become more alarming; the breathing becomes hard; the horse heaves at the flanks, and groans with pain; the pulse becomes small and quick, indicating the progress of fatal inflammation.

When the spells or paroxysms of pain become quicker in their return, and severer and longer, with heaving at the flanks, quickening of the pulse, and breathing very hard, the case may be regarded as alarming, and no time should be lost in applying treatment. On the other hand, when the symptoms become less severe, a favorable termination of the case may be soon expected. The horse gets well very quick in many instances.

The diseases for which spasmodic colic may be mistaken, are flatulent colic and inflammation of the bowels—to say nothing about *bots*. The symptoms by which to distinguish it from flatulent colic have been pointed out under that disease, which see. The same table showing the difference between flatulent colic and inflammation of the bowels, will serve to distinguish this disease from inflammation of the bowels.

Causes.—An irregular and violent contraction or drawing up of a portion of the intestines (or guts) is what produces the pain, etc., which is called spasmodic colic. The muscular coat of the guts is liable to be thrown into cramps, like the muscles of the foot or calf of the leg. These cramps, continued and repeated, is spasmodic or cramp colic. This kind of cramping is likely to take place in horses whose digestive organs are not in a healthy condition. Derangement of the liver, I am quite certain, is often the cause of cramp colic. The attack may be brought on by a large feed of dry food, drinking cold water when hot, or exposure to sudden cold.

Treatment.—The remedies to be relied on in this disease are

antispasmodics, and these must be of the more powerful class. Administer immediately the following :

Take—Chloroform.....	2 drams.
Oil turpentine.....	1 ounce.
Tincture of asafœtida.....	2 ounces.
Warm water.....	1 pint.

Mix, and give as a drench.

If the patient is not better in one hour, give this :

Take—Sulphuric ether.....	2 ounces.
Tincture of camphor.....	1 ounce.
Musk.....	3 grains.
Ginger.....	1 ounce.
Whisky.....	1 pint.

Mix, and give as a drench. Repeat every three hours, omitting the ether, and using in its place sweet spirits of niter, two ounces, until the patient is well.

The horse should be blanketed, and his food should be light for a few days.

KNOTTING OF THE BOWELS.

Under this head I shall explain two distinct ways in which a fatal obstruction in the guts takes place. The first is called *intus-susception*, in which a small portion of the gut (the *ilium*) is drawn in, and, by the powerful action in colic, is forced into the wider portion joining it, like a small tube into a larger one. When this takes place, nothing can pass through the place obstructed ; inflammation and mortification soon follow, and death is the unavoidable consequence.

The other difficulty is an entanglement of the guts, in which they may be wound into nooses, knots, or loops, so firm that the channel of the gut is perfectly closed. This difficulty is another result of colic, and for which there is no remedy. It is followed by inflammation and mortification, and, of course, death.

These difficulties may be suspected from the usual symptoms of colic running into those of severe inflammation, the pain and torture becoming very severe, and nothing passing through the bowels. But there are no symptoms by which to tell, with positive certainty, which of these troubles has taken place. And, if there were, it would only show that the case was hopeless, for nothing could be done to effect a cure.

METEORIZATION.

This is not, properly speaking, a disease of itself. It is a symptom liable to occur during the progress of other diseases of the bowels, very suddenly and unexpectedly. It is a most rapid swelling of the bowels, by the accumulation of gas in the guts, and suffocation is threatened. The animal looks as if blown up, as a boy does a mole. The belly is as tight as a drum-head, and the wonder is that it does not burst. From the great pressure on the lungs, death must soon occur from suffocation, hence the gas must speedily be got rid of. But the back channel does not allow any thing to pass. If the medicines given to expel the gas do not act quick, there is only one remedy left, and that is to plunge an instrument through the flank into the swollen or distended gut. A long, narrow-bladed knife will answer for this purpose. It should be plunged into the side or flank at the most swollen point. A tube, eight to ten inches long, should be at hand, to pass into the hole as soon as the knife is taken out. It would be better to slit the skin before plunging the knife in, to keep it from drawing over the orifice and preventing the tube from being put in. The tube should be just large enough to fill the hole made by the knife.

After the gas has escaped, the animal should be well clothed; and when he gets warm, and reaction has properly come up, to prevent the occurrence of inflammation of the peritoneum from the wound, bleed to the extent of eight to ten quarts.

STONE IN THE BOWELS.

Hard, stone-like substances sometimes form in the large guts of the horse, and may increase to several pounds weight. These give rise to colic, and obstruct the passage through the bowels. Fortunately, they do not occur very frequently. There are no symptoms by which to tell, with any degree of certainty, that they exist in the bowels, and no known means of removing them. They are, probably, a result of indigestion.

STOMACH STAGGERS.

Under this head, I shall include both forms of staggers arising from disordered conditions of the stomach; and I deem this course proper, from the fact that the treatment of the two does not essentially differ.

Symptoms.—The earliest symptoms are a dull heaviness, or drowsiness, with languor or lassitude. These symptoms may continue for a day or more, or, in some cases, not so long, and may not attract the notice of the owner or keeper. But, sooner or later, the horse grows more drowsy, and falls asleep, with his head down, resting against the trough or any thing convenient; his sleep seems very profound—perhaps snoring; and all of a sudden arouses up as if scared, throwing his head violently about, often beating it against the rack or wall; pawing, as if in the act of moving rapidly, being evidently in a state of active delirium; the eyes wear a wild expression; the horse will sometimes fall and rise again; and these symptoms continue until, finally, convulsions (or fits) come on, and the horse dies.

In other cases, the drowsy symptoms continue, and, if roused up, the horse goes to eating, grabs a bunch of hay, and, while in the act of chewing it, again falls asleep, with head in the manger; he braces his head, as if endeavoring to push it forward; if he moves, his gait is staggering. These symptoms continue until the horse drops and dies.

Causes.—An eminent writer says: "This disease never occurs except by the fault of those who have the management of the horse." However true this may be, it certainly ought to be a warning to all owners of this interesting animal to consider well the importance of attention to the subject of his management. That the stomach is the original seat of trouble, can not be doubted; but the injury is reflected, or transferred, as it were, from the stomach to the brain; and hence the symptoms are of a cerebral (relating to the brain) character, instead of indicating disorder of the stomach. This takes place through the great sympathetic nerve, which originates in the brain, and, by one of its branches and its divisions, is spread all over the stomach. The way in which the disease is generally brought on is by allowing the stomach to become debilitated, or weakened, and irritable by long fasting, excessive labor, and, perhaps, without water, and then allowing the horse to eat of dry feed until the stomach becomes crammed or distended; and, from the debility present, the stomach fails to act on the food taken, and no digestion takes place; the food swells, the free circulation of the blood is obstructed, the brain becomes irritated, and the blood flows to it in too great quantity, and the train of symptoms described is the result. When the stomach is weakened or debilitated, it does not contract on the food taken, and hence the animal has no monitor to tell him when enough has been taken, and he continues to swallow as long as the stomach will stretch enough to admit any thing more. This condition of the stomach is often brought on by allowing the horse to go from morning till night without feeding or watering. No horse should be worked more than four or five hours without feeding.

The only diseases with which stomach staggers is very likely to be confounded, are mad staggers and flatulent colic. It may best be distinguished from the former by careful attention to the symptoms of the case generally, and especially to the his

tory of the case, to ascertain if the horse has been so used as to produce debility and irritation of the stomach, and then being allowed too much food of any kind. In flatulent colic, the horse gets down and rolls, looks at his side, etc., but does not stagger when he goes to walk. His mind is not affected, shows no signs of derangement of the brain, and is swollen.

I will here repeat what I have often urged, in substance, at least, that there is no practice so reprehensible, and so likely to do mischief, as that of crowding down a horse gallon after gallon of whatever mixture may be recommended by the bystanders. Examine cautiously the symptoms of the case, and, if possible, find out the cause, and then, when you feel sure of the nature of the case, give the few doses necessary, and trust to their efficacy. Do not torture the horse by those villainous mixtures of every offensive thing, which are so often poured down the poor dumb animal, without sense or reason. Better leave the horse to nature—not a bad doctor generally—than pursue such a course.

Treatment.—The prospects of successful treatment of this disease are not very flattering. Treatment early in the attack may cure it. I should bleed freely in the start, and give an active, quick physic.

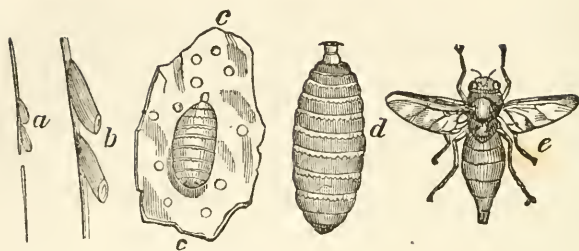
Take—Croton oil.....20 drops.

Crude mercury..... 5 grains.

Mix. To be given in a pint of warm water, as a drench.

BOTS.

The bot is a small, reddish, yellowish grub or worm, which may be found fastened to the inner coat of the upper part of the horse's stomach, from the fall until about the latter part of the following summer. When the bot first attaches itself to the stomach it is very small, and would hardly be noticed if the stomach were opened; but it at once commences to grow,



a Represents the egg of the bot on a hair.

b The eggs ripe or ready to have the grub crawl out.

c c A patch of the stomach with a half-grown bot sticking on. The dots are the places where matured bots let loose.

d A full-grown bot ready to pass through the stomach and bowels naturally and become a gad-fly.

e A gad-fly, the ancestor or mother of the bot.

and in about ten to eleven months will have attained its full size, which is about three-quarters of an inch in length, and little more than a quarter of an inch thick. The bot has a pointed head, armed with two hooks, by means of which it attaches itself so firmly that its body will be almost torn in two before they will let go. Between these two hooks is its mouth, or sucker. Its body is marked by rings running around it.

Bots will be found during the latter part of the fall, winter, and spring, in the stomach of almost every horse that was on grass or worked in the field during the fall. The number found in the stomach of each will vary from half a dozen, or less, to as high as a hundred.

The origin and history of the bot has been carefully studied, and some facts arrived at which are of much importance to the owner of the horse. Truth is what every one ought to be anxious to find out; and no matter what may have been one's opinion, he ought not to let that opinion stand in the way of his believing the truth when it is clearly presented. There is more error among people generally about bots than any thing else relating to the diseases of the horse. For this reason I

ask my readers to lay aside whatever prejudices they may have on this subject, and carefully consider what long experience, and the examination of hundreds of cases of horses after death, have led all thoroughly educated veterinary surgeons to believe on this subject. I have no theory to sustain by what I have to say about bots; I only desire to present truths, which, I am sure, may save the lives of many valuable horses.

Every person has an idea that a species of gad-fly, sometimes called the nit-fly, which troubles horses very much, at pasture or working in the field, during the latter part of summer and part of the fall, is in some way concerned in producing bots. This idea is very correct. The nit-fly is, so to speak, the mother of the bot.

By examining a horse that is on pasture or worked in the field, a great number of little yellow nits will be seen sticking to the hairs on the legs, flanks, and shoulders. These nits are deposited there by the females of the gad-fly. The fly darts through the air very rapidly toward the part on which she intends to deposit the nit. When within a few inches of the place, she poises or steadies herself; and, drawing herself up, darts upon the hair, and deposits an egg. She again leaves, prepares another egg, and deposits it in the same way. Thus, one fly may deposit several hundred eggs in a very short time. Very soon, by the heat of the animal's coat, and the sun, a very small maggot is hatched, which, crawling out on the hairs, produces an itching, which causes the horse to nibble or bite at the place. By this means the maggot gets on the horse's tongue, and is taken into his mouth, and is carried into the stomach along with his food. On reaching the stomach it attaches itself to the upper or insensitive part of the inside coat of the stomach. For a description of this part of the horse's stomach see the article headed "The Stomach." By studying that article you will know just where the bot finds its stopping-place. The bot remains in this place until about the end of the following summer, when it becomes full-

grown, and lets go, and is carried out of the stomach along with its contents, and through the bowels, and is finally thrown out with the dung. But this is not the last of the bot. It burrows in the ground, decreases somewhat in size, its outer skin becomes harder; and after a few weeks the outer shell opens, and a young gad-fly, or nit-fly, comes forth. The female fly becomes impregnated, and commences depositing her eggs on the horse's coat. Thus we have traced the bot in all its changes and habits; and we have only found it an active animal in one of the conditions of its existence, and that is in the state of the gad-fly. When in the stomach of the horse it is only a grub, attached by its hooks to that part of the inner coat of the stomach which is without feeling. Here it grows and matures, and finally loosens its hold, as a ripe berry loosens its stem, and passes out with the contents of the horse's bowels. It is supposed that the bot derives its nutriment from the mucus of the stomach, which he takes in by his mouth, or sucker, which is quite buried in the coat of the stomach.

There are a great many mistaken notions prevalent about the bot. I will refer to a few of these:

Some suppose that bots are hereditary, and naturally come into the horse's stomach, and that they remain there until they get tired of their dwelling-place, and set to work to bore out, as a fellow would out of jail. The first part of this supposition is sufficiently answered by the history of the bot just given. It has been shown that, from the time the maggot is taken into the stomach, to the time the full-grown bot is thrown out, it is about ten months. And from about the last of summer, when the bots have matured, until the beginning of fall, not a bot can be found in the stomach or bowels of one horse in a thousand. So the time of the bot in the stomach is only about ten months; and if the horse is so kept during the fall as not to get any nits deposited on his hair by the gad-fly, he will not have a bot in him for the remainder of the year.

Another common error is, that the horse could not live

without bots; that but for them he would dwindle and die. This opinion is quite disproved by the fact that the horse that is not exposed to the nit-fly during the fall never has bots. Such horses may be found by thousands, and yet they have good health, and keep in good condition.

But by far the most injurious error concerning bots is, that they are the cause of a frequent, rapid, and fatal disease in the horse. Is a horse taken sick, no matter at what season of the year, if he turns up his lip, looks at his side, or puts his nose against it, nine out of ten of those who stop to look at him will pronounce the case bots. Thus, lung fever, pleurisy, inflammation of the stomach, bowels, and kidneys, dry gripes, colic, gravel, and every other disease of the internal parts of the horse have been pronounced bots, and the horse drenched with one "bot medicine" after another, until he has died, or got well, in spite of the medicine. And this doctoring for bots is done just as often in the season of the year that not one bot can be found in the horse, as at any other equal length of time; yes, and on horses that were not exposed to the gad-fly in the fall as often as on any others.

The examination of hundreds of horses that were said to have died of bots has shown that they had actually died of some of the diseases before mentioned. And in many of these cases not a single bot has been found in the stomach. I will select a case or two, which will show how badly persons are sometimes deceived.

A fine horse at one of the livery stables was taken sick about the last of July, and the case pronounced bots by the peddler to whom he belonged, and by as many as a dozen other men, who were said to know a great deal about horses. I was sent for, and pronounced the case colic, and that the horse would die, and offered to bet that not a bot would be found inside his hide. He died in about an hour. He was opened, and the stomach found full of undigested, swollen food, and greatly distended, and not a single bot could be found.

Another case occurred about the end of July. A fine mare, belonging to a farmer, died before I reached the case. Every one present said she died of bots. I differed with all. She was opened, and the stomach found in the most healthy condition. But a perfect knot or twist was found on one of the small guts, entirely preventing any thing from passing through it. Mortification had taken place, and death of course followed. Not one bot was found in her. She had been drenched and dosed for bots for two days. I might mention other cases, but these will be sufficient to show what an examination after death will prove.

But the strong and clinching argument of those who think bots such a fearful cause of disease is, that, after death, it is often found that the bots have bored entirely through the stomach. This they take as conclusive evidence that the bots had gone to work boring through the stomach when the horse was yet healthy, and that the symptoms of pain the horse began to show were caused by the boring of the bots.

I must ask the patience of the reader while I explain these points. It is to his interest to understand this matter perfectly. But let us first inquire why the bots should remain so long in the horse's stomach, which is their natural place of existence, and then, all at once, set to work to bore out through the walls of the stomach, thus destroying not only the horse they lived in, but themselves also? This is a question for the bot advocate to answer: Why the bots should commence boring through a healthy stomach? It is the dwelling-place nature furnished them; why should they be so foolish as to want to destroy it while it is yet tenable. Man himself is seldom so foolish as to destroy his own house, with himself in it. He does, sometimes, tear his house down, when it is on fire, especially if, by accident, he is locked in it when it takes fire. We will find that the bots act on the same principle of self-preservation when they do commence boring out of the horse's stomach.

It has been shown that the stomach of the horse is the natural

place of existence for the offspring of the gad-fly during about ten months of its existence; that it is attached to that part of the inside coat of the stomach by its two hooks, and that its mouth is quite buried in this; and that its food is the mucous secretion of the stomach. These facts should be borne in mind.

Now, if the bots do commence boring, what is the cause of it? It can not be because the food in the stomach is distasteful to them, for they never taste that; their food is the secretion of the stomach itself, not its contents. And, before any considerable change can take place in the character of the mucus secreted by the stomach, very serious disease of the stomach itself, or of the horse's general system, must take place.

When the bots commence boring, what is it for? It is because their natural food has so changed that it is no more fit for their use, and has actually become their poison. They then set to work and bore to the second coat of the stomach; but their trouble is not yet relieved, and they may go on through into the cavity of the abdomen or belly. But such change in the character of the mucus can not take place until the horse is far gone in disease, or nearly dead. In the great majority of cases of disease, the bots remain perfectly quiet and secure until the animal is dead. Their dwelling-place is then destroyed, and their food becomes poison. They go to work to get out, but get only into the cavity of the abdomen, their situation being not at all bettered by the change.

From these reasons, it is certain that bots never attack a healthy stomach, and hence, such a thing as a disease being produced by their boring does not exist. They are in no case the cause of any of those diseases which are so often pronounced "*bots*."

If any one is not satisfied that the fact of bots being found to have bored through the stomach is no evidence that they produced the disease of which the horse died, let him open the stomachs of any number of horses that have died in the spring of the year, some hours after death, and, no matter what dis-

ease the horses may have died of, the bots will be found either at work, or already bored through the stomach. They never went to work of their own will; the changes the stomach had undergone while the animal was dying, or after he was dead, caused them to go to work.

So far as is now known, the bots are quite harmless in the horse's stomach. There is no known disease caused by them. An intelligent and careful examination of the symptoms of any of those cases commonly pronounced "*bots*," will show that the case is one of gripes, inflammation of the bowels, colic, or some other disease of the internal organs.

Instead of bots being dangerous in the horse's stomach, and liable to produce disease, some intelligent veterinary surgeons have thought they may serve some valuable purpose. But this is not certain. But it is true that, while thousands of horses have bots in them, they enjoy quite as good health as those without them. They seem in no way to affect the horse's health.

If the foregoing arguments and conclusions are true, it will readily be seen how utterly useless are the thousand and one drenches and potions which are so often given to cure the horse of bots. It will also be seen that many of them may prove not only useless, but may do very great injury. For the most dangerous and destructive articles are often given under the vain idea of "making the bots let go"—articles which any sensible man ought to know would kill the horse. I have known a quart of strong ooze or infusion of tobacco poured down a horse for this purpose. Corrosive sublimate has been given. Among the less harmful measures may be mentioned milk and molasses, lime-water, buttermilk, sage tea, and the use of charms.

Under the use of these means, time is given the horse to get well, if whatever disease he is suffering from is not too powerful for nature to effect a cure. But they are certainly useless. And, if the case is a severe one, this foolery of bot

treatment causes valuable time to be lost, and, very likely, the death of the horse. The treatment is for an imaginary disease, and the true one is not discovered until, perhaps, it is too late.

But if the bots were really troubling the horse, let us see what would be the prospect of getting them away. Their mouths are buried in the mucous coat of the stomach, and their bodies are covered with a tough skin, so that nothing taken into the stomach can, in any way, get into the bots, to make them sick and let go their hold. Again, any thing strong enough to sufficiently irritate the skin of the bots to "make them let go," would be strong enough to kill the horse. Bots will live for a long time in turpentine, and even aqua fortis (nitric acid) does not immediately kill them.

It is impossible to tell whether there are bots in a horse's stomach or not. There is no sign or symptom by which the fact can be known. And if there were, it would be of no real advantage, which is very fortunate.

When the bots have matured, and of their own will let go their hold, and are passing out with the dung, they may fasten under the horse's tail and among the hair, to some extent. All that is necessary is to brush them off. There is no call for dosing or doctoring the horse for bots or worms in such a case.

Every one's experience must have convinced him that "bots" is the great "*scape-goat*" of our numerous pretended "horse doctors." It is a blessed thing for them, when they do not know what ails the horse, to call it "bots," and go to work. But the intelligent owner will not allow his horse doctorred for this imaginary disease. Better trust the horse to nature, than have medicines blindly poured down him. He will be much more likely to get well.

I have taken up much space with this subject. I have, I believe, presented many important truths. I know it is hard to overturn long-established notions. I have no love for dif-

fering with men, but I have great love for truth, and I certainly believe that what I have said will be the means of saving many valuable horses from destruction.

Treatment.—All I have to say is, that, when a horse is sick, and said to have “bots,” study well his symptoms, and ascertain the real disease affecting him, and then use the proper remedies to cure it. Do not allow drenches and the like to be given for “bots.” They will do no good, unless by accident, and very likely they will do mischief. Nature herself will not kill as many horses as the bot-doctor will. Trust her rather than him.

DIARRHEA.

This is too frequent operations on the bowels—the operations being changed in their appearance from their condition in health. The bowels being simply loose should hardly be called diarrhea. Such a case requires but little more than rest and some attention to diet. But the case may continue until the horse is certainly not well in consequence of it, and yet the operations present no bad appearance. I would then recommend the following:

Take—Rhubarb, powdered.....1 ounce.
 Salts of tartar.....1 ounce.
 Ginger, powdered.....4 drams.
 Opium, powdered.....1 dram.

Mix, and divide in three parts, and give one every three hours, in gruel, as a drench, until cured.

But if the operations are of a very watery character, and of a dirty, whitish, yellow color, and only mixed with the proper matter of the bowels, and the strength and spirits of the animal are becoming reduced, give this:

Take—Tincture of camphor.....2 ounces.
 Sulphuric ether.....1 ounce.
 Tincture of capsicum.....1 ounce.
 Tincture of opium.....1 ounce.
 Warm water.....1 pint.

Mix, and give as a drench.

If the purging is not checked in four hours, give the same again. Let his diet be dry meal, and let him have but little water. Hay tea may be given as a drink.

If it is intended to check the bowels at once, the following may be given:

Take—Tannin	40 grains.
Tincture of opium	1 ounce.
Tincture of kino	1 ounce.
Water	1 pint.

Mix, and give as a drench. To be repeated in three hours, if necessary.

But the safest plan is to use such remedies as the first of the above prescriptions. By such a plan the unhealthy condition of the bowels is corrected, and then the discharges checked up.

SCOURS IN COLTS.

Scours, or diarrhea, is by no means an uncommon disease among young colts, occurring from the age of a few days to a few months. It resembles, in its character, cholera infantum in the human infant, but occurs at a more tender age, generally. It is a very fatal disease, and especially so when harshly treated.

Symptoms.—These can hardly be mistaken. Very frequent operations on the bowels, of a thin, watery, dirty character, attended with griping pain; the spirit and strength of the colt fail very fast; the discharges from the bowels become of a green or slate color, and sickeningly offensive; and the patient dies from the effects of the loss of strength and internal inflammation. All cases do not seem to be alike, but the above is the general course of the disease.

Causes.—Bad management or ill health of the mother is the chief cause of scours in the foal. I will here refer the reader to what has been said on breeding and raising. I

have generally found that, where the colt takes scours, the dam is giving an unusual quantity of milk, and hence the colt takes more than it is able to digest. But it is likely, in such case, that the milk becomes unhealthy before drawn. Colds, or exposure to bad weather, may bring on scours in the colt, by first affecting the dam, and then the colt, or it may affect the colt directly.

Treatment.—As prevention is always better than cure, the breeder should so attend to his mares that scours will not occur in the colts. No sudden change in the feed of the mare, nor her general management as to stabling, etc., should be made soon after foaling.

If she has been kept up and fed on dry feed, she should be changed from that to pasture, or green feed, very gradually. She should not be turned out on a bare pasture, with both herself and her colt to nourish, on the principle of "root, hog, or die," as is too often the case. The mare suckling a foal needs good, regular feeding, and wants to be protected from foul weather. If her digestion or bowels are deranged by starving, unwholesome diet, or gorging, or any other cause, scours in the colt will very certainly be the result.

At the tender age this disease occurs we must give medicines very cautiously, lest we kill our patient. Medicines given to the mother will affect the suckling young; hence we may reach the colt in this way:

Take—Pulverized yellow-root.....	1 ounce.
Pulverized rhubarb	1 ounce.
Salts of tartar.....	1 ounce.
Tincture of prickly-ash berries.....	2 ounces.
Tincture of opium	2 ounces.
Thin gruel.....	2 pints.

Mix, and give one-third part to the mother, every four hours, as a drench.

The following may be very safely given to the colt:

Take—Powdered rhubarb.....	40 grains.
Powdered yellow-root.....	40 grains.
Salts of tartar	60 grains.
Essence of peppermint.....	1 ounce.
Tincture of prickly-ash berries.....	1 ounce.
Tincture of opium.....	$\frac{1}{2}$ ounce.
Thin gruel	1 pint.

Mix, and give four table-spoonfuls to the colt as a drench, every three hours.

Milk the mare, so that the colt will get only enough milk to keep him up. Strong hay tea is good to nourish him, given frequently as a drench.

COSTIVENESS.

Costiveness hardly deserves to be called a disease, but it may be symptomatic of some lurking disease in the system. It may be so obstinate as to require special treatment.

Treatment.—The first thing to be done is to give a physic, to open the bowels. These medicines may be given with a view of restoring the bowels to a healthy action. For a physic, give one ounce of aloes and a table-spoonful of ginger, in a pint of warm water. Feed bran, scalded, before and after giving the physic. To restore the healthy action of the bowels, give one of the “condition powders,” recommended in another part of this work.

COSTIVENESS IN COLTS.

This is quite a common ailment in young colts, but is not generally dangerous. It is known by the colt not having an operation on its bowels for a considerable time. It may be owing to derangement of the mother's system. See that her health is properly attended to. A physic given the dam will open the colt's bowels. But it is not always prudent to wait this slow process. Take a piece of Castile or common bar-soap, of sufficient size to make a plug about two inches long, and as thick as the little finger; moisten it, and gently force it into the

anus or fundament, and let it remain. This will cause the bowels to act. One or two grains of podophyllin given every day to a colt that is troubled with costiveness will cure it. It may be given in a few table-spoonfuls of water. Twenty grains given to the mother will have the same effect.

JAUNDICE.

This disease is sometimes called *yellows*. It is known by a yellow discoloration of the skin, which is caused by the bile not being carried off from the liver in the natural way, but taken into the blood, and spread through the whole system. The yellowness can only be seen where the parts are not covered with hair; but every part of the skin, fat, flesh, and every part through which the blood flows, if it could be examined, would be found to be tinged with the yellowness of the bile.

Symptoms.—The first symptoms of jaundice that will likely be noticed are yellowness of the mouth, nose, and eyes, and a yellowness of the urine, or water. These symptoms will show that the case is one of jaundice. But before these symptoms may have been observed, other appearances of ill health may have been noticed. The horse may have been observed to be lazy or sluggish in his movements, and drooping when standing. As the disease progresses, the sinking of the strength and spirits increases; the head hangs down, the eyelids fall, and may become quite closed. There is a great degree of stupor, and the horse reels or walks unsteadily, and this may even be so bad that he may fall down. His breathing is affected, and his pulse increased in frequency. The bowels are costive, and the dung-balls are hard, and smeared over with a yellow, slimy mucus. The water, throughout the whole course of the disease, is scant and yellow.

Causes.—The immediate cause of the disease is the bile being carried from the liver into the blood, instead of passing from the liver into the intestine or gut. The horse has no

gall-bladder, like many other animals, and for this reason he is not liable to have jaundice from the bile becoming hardened in it. It must be caused by some obstruction in the one duct, or tube, which conveys the bile from the liver to the gut as fast as it is formed, or in the substance of the liver itself. Jaundice may follow inflammation of the liver, and, I think, is generally the result of a mild attack of inflammation of the liver. It may accompany inflammation of the stomach or lungs, the liver being affected by sympathy.

Treatment.—The object is to arouse the liver to the healthy performance of its office; or, if the disease results from obstruction in the biliary duct, to relax it so as to let the bile flow freely into the bowels. As it can not be ascertained which of these objects is the one to aim at, I make use of such remedies as will accomplish either, or both, at the same time. In the first place, apply a blister over the liver. If the patient does not improve rapidly, reapply it every day. Internally give the following relaxing cathartic dose:

Take—Powdered aloes 6 drams.

Powdered May-apple root.....4 drams.

Powdered lobelia herb.....1 ounce.

Warm water 1 quart.

Mix, and give as a drench. If it does not physic in twelve hours, repeat the dose.

After the action of the physic, follow up with the following:

Take—Powdered May-apple root.....2 ounces.

Powdered golden-seal 2 ounces.

Mix, and divide in twelve papers; one to be given twice a day in warm water.

The above physic may be repeated every third day, if the horse does not improve.

BLISTERS ON THE TONGUE.

The tongue of the horse, though a very important organ, is, fortunately, very seldom the seat of disease. It is sometimes affected by blisters of greater or less size appearing along the under surface, and occasionally on the cheeks, and characterized by the dribbling of saliva. The disease can not be mistaken if the mouth be examined.

Treatment.—The blisters must be nipped with a pair of scissors, to let the fluid out of them. Then take powdered alum, one table-spoonful, and myrrh, one tea-spoonful; mix, and wrap up in a piece of thin muslin, and tie it around the bridle-bit, and put the bridle on him for one or two hours every day until cured; or, after clipping the blisters, mix burned alum and meal, or bran, and scour the mouth three times a day with the mixture.

SLAVERING.

From certain causes the glands of the horse's mouth become excited to secrete a great quantity of saliva, and it runs from the mouth in the form of slavers; it may be to such an extent, or so long continued, that the horse may be seriously reduced in strength and flesh by it.

The principal cause of slavering is the eating of white clover. But it does not affect all horses alike. Some will soon get used to it, so that it will not affect them. Mercury will salivate the horse; the sharp edge or snag of a tooth, or a rough bit, with a rough rider or driver, may cause soreness or irritation of the mouth, and slavering.

Treatment.—Get rid of the cause. If it is clover, or clover hay, stop its use. If a broken tooth, take it out; if a sharp edge of a tooth, rasp or file it smooth; if a rough bit, change it. In any other case, see that the horse has good, wholesome food, and look to it that he is not laboring under worms or indigestion.

If the slaving does not stop with the removal of the cause, use the following:

Take—Powdered bay-berry bark.....	1 ounce.
Powdered sumac berries	1 ounce.
Powdered ginger.....	1 ounce.
Flowers of sulphur.....	2 ounces.

Mix, and give a table-spoonful of the powder in the feed, two or three times a day.

The mouth may be washed once or twice a day with alum-water, or a strong tea of any astringent plant or bark, as black-berry root, white-oak bark, or witch-hazel.

THRUSH IN THE MOUTH.

Thrush (or apthæ) in the mouth consists of little red patches or pimples on the inside of the mouth and on the tongue. There is considerable heat and tenderness in the mouth, and the horse chews his food with difficulty, often letting it fall out of his mouth. These sores may become of considerable depth, and quite offensive. Apthæ generally occurs in young horses. It may be the result of that irritation which attends teething.

Treatment.—A strong tea, or infusion of sage and hyssop, with honey and borax, makes a good wash for the mouth; to be applied three times a day, with a soft swab. An ounce of tincture of muriate of iron, to half a pint of water, is good. Half an ounce of chlorate of potash, to half a pint of water, is, perhaps, the best. To correct digestion:

Take—Powdered golden-seal	2 ounces.
Powdered sassafras.....	4 ounces.
Flowers of sulphur.....	2 ounces.

Mix, and give two table-spoonfuls at a dose, twice a day, in chopped or cut feed.

WORMS.

There are several different kinds of worms found in the intestines of the horse. Of these, the principal are the *long round-worm*, found in the small intestines, and the *needle-worm*,

found in the large intestines. Other varieties are sometimes found in the stomach and bowels, but it is not necessary to describe them.

The *long round-worm* is from six to ten inches long, and resembles the common earth-worm, or the same worm found in the human. It inhabits the small intestines. Very large numbers of them may exist in the horse's bowels, and, by their drain on the food of the horse, and the obstruction they cause to the natural action of the intestines, cause him to lose condition, and though he may eat quite enough, not be benefited by it.

The *needle-worms* occupy the large bowels, sometimes in incredible numbers. They are darker-colored than the long round-worms. They are from three-quarters of an inch to two inches in length. They are slim and sharp-pointed. Great numbers of them often descend into the *rectum*, or last gut, and become very troublesome to the horse.

The *tape-worm* is very seldom met with in the horse. It could only be certainly known by parts of it being found in the dung.

Symptoms.—Worms may exist in the horse's bowels in considerable quantity, without causing disturbance of his health. The symptoms of worms are not always very satisfactory. When they are troubling him much, the coat will become unthrifty, the hide tight, and belly tucked up, and the appetite greedy. Cough may sometimes be caused by worms.

But these symptoms may indicate other diseases, and, of course, a careful examination for any other disease that gives rise to the same symptoms should be made; and, if none can be found, worms may be suspected, and remedies for their removal given.

But a very reliable symptom of worms is a rough, scaly appearance about the fundament, which may be seen by raising the horse's tail. A still more reliable one is the discharge of a whitish, yellow mucus, which dries up, leaving yellowish

scales sticking around the fundament or anus. This generally indicates the presence of needle-worms.

A horse troubled with needle-worms will also show signs of uneasiness, frequently rubbing his tail against objects, or tucking it under and switching.

Causes.—Some suppose worms to be natural, and even beneficial, in the bowels; but this is a mistake. An unhealthy condition of the mucous coat of the bowels is most likely the cause of worms. Under the head of worms I have not said any thing of bots, for they are not properly worms.

A very careful examination of the symptoms is the only way to distinguish between worms and some other diseases which present nearly the same symptoms.

Treatment.—Several different preparations are used for expelling worms. Among them the following may be relied on:

Take—Powdered aloes.....	1 ounce.
Calomel	60 grains.
Tartar emetic.....	30 grains.
Warm water.....	1 pint.

Mix, and give as a drench.

The following is also effectual in removing worms:

Take—Tartar emetic.....	1 ounce.
Powdered aloes.....	2 ounces.
Powdered ginger.....	2 ounces.
Saltpeter.....	2 ounces.

Mix, and give one tea-spoonful twice a day, in the feed.

The following, though in country places somewhat difficult to obtain, is a certain remedy for any kind of worms:

Take—Powdered white Indian-hemp root.....	1 ounce.
Powdered May-apple root.....	1 ounce.
Powdered pink-root.....	1 ounce.
Powdered bitter-root	1 ounce.
Powdered balmony.....	2 ounces.
Powdered aloes.....	$\frac{1}{2}$ ounce.

Mix thoroughly together, and give one table-spoonful of the powder every

twelve hours, mixed in half a tea-cupful of molasses and a pint of warm water, as a drench, until it physics. In five or six days, give it again the same way.

The pin-worms, which sometimes inhabit the rectum, or last gut, may be brought away by an injection of strong salt-water, or a tea of tobacco.

DISEASES OF THE BREATHING ORGANS.

COMMON COUGH.

THIS is more properly called *chronic cough*. It is the dregs or remains of other diseases of the air-passages, in most cases. It is a disease which should not be neglected, for it will, very likely, run into more serious disease. Chronic cough must not be confounded with the cough which occurs in other diseases, as catarrh, influenza, bronchitis, strangles, etc.

Symptoms.—This affection is known by a continued cough, mostly of a harsh, dry character, but, in some cases, a thick mucus is thrown out from the nose. The general health of the animal is not usually much affected. The disease is, as before remarked, the result of, or remains after, the disappearance of more severe diseases of the lungs and air-passages. In these cases, in which irritation of the air-passages is the cause of the disease, the cough will be excited when the horse drinks cold water, or is taken out into the cold air, and there will be some mucus discharged in most cases. When the cough results from worms, it will be soft, and accompanied with a frothy mucus; the horse's coat will be staring, and other symptoms of worms be present. A cough resulting from deranged digestion is harsh and hard, and very violent, and generally occurs after eating, when the stomach is distended and pressing on the lungs.

Causes.—These have been sufficiently explained in giving the description and symptoms.

Treatment.—This will depend much on the cause of the cough. A clean, dry stable, with fresh, pure air, is very important. In a cough depending on irritation of the air-passages and lungs, following other diseases, give this:

Take—Tartar emetic	1 ounce.
Resin.....	2 ounces.
Blood-root.	1 ounce.
Salts of tartar.....	2 ounces.
Ginger.....	2 ounces.

Mix, and give a tea-spoonful three times a day, in the feed.

When the cough results from worms, *treat the patient for worms*, and then give the above, if the cough continues.

When the cough is dependent on derangement of the digestive organs, the following may be used:

Take—Powdered golden-seal.....	2 ounces.
Powdered blood-root.....	2 ounces.
Powdered pleurisy-root.....	2 ounces.
Garlic, cut fine.....	4 ounces.
Sulphur.....	2 ounces.
Powdered sassafras bark.....	2 ounces.

Mix, and give a table-spoonful twice a day, in the feed.

The horse should not be allowed as much water as he will drink, so that he will more readily drink flax-seed or slippery-elm mucilage, which he should have plenty of while the cough continues.

NASAL GLEET.

This is a disease of a chronic or continuous character, manifesting itself in a very copious discharge from the nostrils, but is not attended by any other of the ordinary symptoms of cold, except in the first stage of the disease. In all other diseases of these parts the glands are affected.

Symptoms.—The symptoms of this affection are not numer-

ous, and it may be distinguished from other diseases by the characteristics mentioned when we come to speak of the causes. A discharge of yellowish mucus from the nose, of a thick character, and in large quantity, and thrown out many times during the day, is the only particular symptom of the disease. This discharge is subject to certain changes; sometimes stopping for several days, in fine weather, and then re-appearing as bad as ever. It may also assume a greenish hue, or be streaked with green, when the horse is at grass. This is caused by the green coloring matter of the grass mixing with the mucus far back, where the nostrils open into the mouth. It will occasionally be streaked with pus, or matter, which must be discharged from ulcers within the cavity of the nose. The disease may continue for many years, and do the horse but little apparent injury; but, by its continual wasting, it may reduce the horse to low condition, and, consequently, predispose to other diseases, or even destroy him. This disease is very annoying, as it renders every thing about the horse most filthy.

Causes.—Many contrary opinions of the nature and cause of this disorder are entertained. Some are of opinion that it is a forerunner of glanders, or is the first stage of it, and, if neglected, will terminate in it. Others think it the effect of “broken wind.” Several other causes are assigned. That it is not necessarily connected with glanders, I think is evident from the following facts: Gleet is a profuse discharge; glanders is a scant one. The discharge in gleet changes its color, or is stained by the food; the discharge in glanders keeps of one color. Glanders ulcerates the nostrils, with no tendency to heal; gleet does not, or very seldom, and when ulcers do occur, they heal of themselves. Gleet never runs into farcy; glanders often does. I have known horses to have gleet for five or seven years, and run and work with others, and never infect them, or “give them the disease.”

Any disease that reduces the constitution may, perhaps,

terminate in glanders or farcy, or give rise to them. So will bad treatment, and poor keeping, in a close, dirty stable. In this way, gleet may result in glanders, but I deny that it is a forerunner of glanders, or, in any way, necessarily connected with it. The membrane lining the extensive cavity of the nose, called the *sniderian membrane*, secretes a mucous fluid for the purpose of moistening its surface. Now, when this membrane is inflamed or irritated, this secretion is greatly increased, as in cold. It is well known that when active inflammation or irritation is neglected, or improperly treated, it will become chronic. Such is the character of gleet. It is a chronic irritation of this membrane.

A familiar example, of an entirely similar irritation, is observed in continued sore eyes in the human patient, being the result of active inflammation from cold.

Its effect is to cause a thickening of this very thin lining of the cavity of the nose, and keep up a constantly increased flow of its secretion. And it most frequently results from catarrh or strangles.

Treatment.—This disease is by no means readily cured. Being of a chronic character, it requires time and patience to effect a cure. The horse should have good feeding, not of a stimulating character, and should be carefully protected from exposure and damp, cold weather. Pure air is very important to him. The following internal remedy must be given:

Take—Alum, pulverized.....	2 ounces.
Indigo, pulverized.....	1 ounce.
Cantharides, (Spanish flies), pulverized..	2 drams.
Spanish brown.....	1 ounce.

Mix thoroughly together, and give one tea-spoonful twice a day, in the horse's feed.

The use of this should be continued until the discharge has stopped, and the inside of the nostrils are of their natural appearance. At the same time of commencing with the

above, commence using the following, to be injected into the nostrils.

Take—Sugar of lead.....	$\frac{1}{2}$ ounce.
Sulphate of zinc.....	$\frac{1}{2}$ ounce.
Blue vitriol.....	$\frac{1}{2}$ ounce.
Warm rain-water.....	1 gallon.

Dissolve the other articles in the water.

Inject enough of this to pass entirely up the nostrils, once a day, with a syringe. Continue the use of this as long as the discharge continues, or until the cure is effected. Keep his-head raised above a level when using it.

BLEEDING FROM THE NOSE.

This may occur in the advanced stages of certain diseases. It is also a symptom of apoplexy and congestion of the brain. An ordinary bleeding from the nose is not at all dangerous. Rest, and cooling applications to the head, and a gentle physic, or from four to eight quarts of blood taken from the jugular vein, will prevent a threatened attack of apoplexy. The bleeding is a very safe remedy when on a journey, and medicines are not in reach, or their action can not be waited for.

If the bleeding is from one nostril, and of a dirty color, and frothy, and the breath fetid or stinking, and the blood is mixed with matter, the case is one of glanders, *sure*. Beware of him.

CONSUMPTION.

The lungs of the horse are the seat of a disease in every respect similar to consumption in the human subject, and quite as fatal in its results.

Symptoms.—The first observable symptoms are a degree of hide-bound with the common unthriftiness of the coat. After awhile a slight cough may be observed, and the muscles may be observed to be becoming flabby, the horse losing strength, and sweating on the slightest exertion. The breathing be-

comes more rapid and laborious, with slight heaving at the flanks. The cough becomes worse, but short and dry; the pulse will be found small and increased in frequency. The horse is down in spirit, and is evidently sick. Pressing on the spaces between the ribs will show that there is tenderness in the chest. Dyspeptic symptoms are present, the appetite being sometimes good, but at other times very poor. As the disease advances, all the symptoms become aggravated; the horse loses strength rapidly, the cough becomes worse, the breath very offensive, and a thick, corruption-like matter is discharged from the nose. Diarrhea, dropsical swelling of the legs, and great wasting of the flesh take place, and death relieves the doomed victim. Such are the ordinary symptoms of consumption, and it is hoped they will be sufficient to enable the ordinary observer to suspect the existence of the formidable disease. But many of these symptoms may attend other maladies, and hence the horse should not be too hastily condemned as the subject of consumption.

Causes.—There can be but little doubt consumption is one of the diseases of the horse peculiarly the result of domestication. It is much more common in the cities than in country places, doubtless owing to the greater impurity of the air in the city; the city air being deficient in oxygen and overcharged with carbonic-acid gas, thus, by necessity, producing a carbonized condition of the blood, which is the very cause of tuberculous disease, whether it seats itself in the lungs or any other organ. Ill treatment, as a close, filthy, confined stable, may produce this disease. A peculiar form of body may render one horse more liable to it than another. This peculiar form may be transmitted from sire or dam to the offspring. If they have feeble lungs, of course their stock will have such. Leggy, thin-chested horses, with naturally feeble lungs, can not resist the causes of consumption as well as horses with large chests and powerful lungs.

Treatment.—From what has been said above, it is evident

that if this disease would be avoided, the breeder must look to it that his mares have good, large, sound lungs, and that he breed them to horses with such. By this means the first foundation for consumption will be avoided. In the next place, his habits of work and stable management must be such that the most perfect development of the lungs will be received, and the horse have the best pure air possible. Attention to the laws of health, as given in another part of this work, will render consumption almost unknown, except in cities. And here the most careful attention to the purity of the air, and proper attention to the horse, is the best that can be done. It can hardly be possible to avoid it entirely in the city.

After tubercles have once formed in the lungs, and, of course, occupied very much of their space, and advanced to such an extent as to give rise to those symptoms which are recognized as constituting a case of consumption, we have but the least faith in any thing effecting a cure. We don't believe in it at all. And if it were possible, by a course of half a year or a year of treatment, to make a cure—and it certainly could take no less time—would the horse, with a large part of his lungs useless, as they certainly would be, be worth the time and expense devoted to him? But, as other and curable diseases may sometimes be mistaken for consumption, a horse supposed to have consumption should be allowed the benefit of reasonable time, and some general alterative treatment. Humanity would dictate as much. I would suggest the following: Let the horse be put on grass, if possible, when the weather will admit of his being out, but be kept up at night in a well-ventilated stable. Let him have a feed of oats, meal, or shorts in the morning, and use as an alterative the following prescription:

Take—Phosphate of lime.....	2 ounces.
Powdered blood-root.....	.2 ounces.
Powdered golden-seal.....	.2 ounces.
Powdered resin.....	.2 ounces.
Powdered spikenard.....	.2 ounces.

Mix, and give one table-spoonful, in the feed, once a day.

This may be continued for a length of time. Tar-water may be given him to drink, which he will take, after becoming dry enough.

DROPSY OF THE CHEST.

This is a collection of serum, or water, in some of the cavities of the chest. The quantity of water may be very great. It is always fatal. The scientific name of the disease is *hydrothorax*.

Symptoms.—There is considerable excitement of the system, the pulse increased in frequency, the breathing very laborious, the feet and legs cold, and there is some puffiness or water under the skin, about the chest and breast; the gait is awkward and straddling with the fore-feet. The animal loses flesh very fast, and looks haggard; strength rapidly fails, and the animal refuses to lie down until death takes place.

Causes.—The most common causes of dropsy of the chest are badly-treated pleurisy, pneumonia, etc. Any thing which reduces very much the red part of the blood may cause it.

Treatment.—All experience would seem to show that this disease is out of the reach of medicine. I believe one result has attended every plan yet suggested, and that is death. Tapping has been tried, but with no good results. I have nothing to offer. The disease will soon pass to its termination.

HEAVES, OR BROKEN-WIND.

A violent, heaving action of the ribs and flanks, as the air is driven out of the lungs, is generally known by the name of *heaves*, *broken-wind*, or *thick-wind*. It very much resembles asthma in the human patient; but that disease only occurs in paroxysms, or spells, whereas heaves is constant, especially when the horse is exercising.

Symptoms.—The peculiar violent, heaving action of the ribs and flanks, in forcing the air from the lungs, is sufficient evidence of the existence of the disease. By observing the

breathing of the patient, it will be seen that two efforts are made to expel the air from the lungs. There is, generally, a sort of dry, husky, gruntish cough, and both it and the heaving are greatly aggravated if the horse is exposed to any dust. The belly, in heaves, becomes enlarged, and the horse is said to be pot-bellied. Indigestion, or dyspepsia, is a common accompaniment of heaves. The horse may be a great eater, and the large quantity of food taken only aggravates the trouble. The horse looks rough and stupid, and is generally used up. He is of but little account for any purpose.

Causes.—The more common causes which produce heaves are over-exertion and indigestion; and there can be no better way of producing it than by putting the horse to severe labor or exertion on a full stomach. The race-horse and the carriage-horse are guarded against this accident by not being required to perform while the stomach is full or distended. It may result from some other diseases. A running together or rupturing of the air-cells of the lungs gives rise to this sort of breathing. A mere enlargement of the air-cells, or a puffy condition of the substance of the lungs, will cause it.

Treatment.—That treatment of the horse which will prevent the occurrence of this disease is of more importance to be attended to than the administration of drugs, with a hope of curing it, after it has taken place: regular and moderate feeding, and moderate exercise when the stomach is full; and, when the labor is necessarily severe, let the food be of that kind that is nutritious, but not bulky. The horse should not be allowed to swell the stomach with water, after feeding—a habit too prevalent in this country. Free room for action is necessary to the health of the lungs, when the horse is at service, and this they can not have, if pressed by a gorged stomach.

Of course, many remedies have been recommended for heaves, and I presume about the same want of success attends all of them. The following may be used to relieve the horse, or palliate the disease:

Take—Spanish brown.....2 ounces.
 Tartar emetic.....2 ounces.
 Resin.....4 ounces.
 Ginger.....2 ounces.

Mix, and give two tea-spoonfuls twice a day, in the feed. At the same time use the "*flax-seed jelly*."

The next prescription is said to cure heaves:

Take—Indigo.....1 ounce.
 Saltpeter.....4 ounces.
 Rain-water.....1 gallon.

Mix, and give one pint of the liquid twice a day, in the feed.

The diet should be small in quantity, and nutritive. The horse should not be allowed to gorge, nor should he be allowed to drink too much; should especially be kept from musty or clover hay.

ROARING.

This malady in the horse is known by the peculiar roaring, whistling, or blowing sound produced in the breathing. It is only observed when the horse is exercised. It is the result of some change in the air-passages. This change may be either a thickening, hardening, thinning, or contraction of the portion of the air-passage affected; or it may result from the filling up of the tube by a tough, false membrane.

Treatment.—Thorough blistering, over the part of the air-passage which seems to be affected, may do good in the early stage of the disease, and, at the same time, using the following, with a view to removing any false deposit in the air-passages:

Take—Indigo.....1 ounce.
 Saltpeter.....4 ounces.
 Rain-water.....1 gallon.

Mix, and give one pint, in the feed, twice a day.

But, in the advanced stages, it is hardly worth the trouble to attempt treatment, for it is of but doubtful utility. It may be

well to remind the owner that he may produce the disease by too tight reining up, especially in the young horse. Other diseases, as strangles, bronchitis, influenza, etc., that are liable to give rise to it, should be well cured, and thus avoid the danger.

THUMPS.

A violent beating or throbbing in the flanks of the horse is called thumps. It is palpitation of the heart. The attack is generally the result of overwork, and particularly in warm weather. Some horses can hardly be used at all without bringing on thumps. Such a horse is very unreliable for service. It may depend upon mere nervous derangement of the heart, and be very short in its duration; or it may result from organic disease of the heart, when the attack will be easily provoked, and hang on very obstinately; or the horse may at no time be entirely free from it.

Treatment.—In a slight attack, occurring from over-exertion, a bucket of cold water, with a double-handful of salt dissolved in it, may be given to the patient. He should have rest, and stand in a cool place. If the attack hang on obstinately, give the following drench:

Take—Tincture of digitalis.....1 ounce.
 Sweet spirits of niter.....1 ounce.
 Tincture of asafetida.....1 ounce.
 Sulphuric ether.....1 ounce.
 Water.....1 pint.

Mix. Repeat the above every three hours until well.

Or the following may be used:

Take—Spirits of camphor.....1 ounce.
 Muriate of ammonia.....10 grains.
 Sweet spirits of niter.....1 ounce.
 Water.....1 pint.

Mix, and give as a drench, and repeat every three hours until the patient is well.

The diet of a horse that has had a severe attack of thumps should be light for some time, and he should be allowed rest.

DISEASES OF THE URINARY ORGANS.

SUPPRESSION AND RETENTION OF THE URINE.

SUPPRESSION of the urine is sometimes called "*stoppage of water*." The water may not pass at all, or part of it may dribble away, but not sufficient to give relief. There is a difference between suppression and retention, important to be remembered. In suppression of the urine, the kidneys do not secrete any water, or but very little; in retention of the urine, the water is properly secreted by the kidneys and poured into the bladder, but is not passed off, or only a part of it dribbled away.

Symptoms.—The most marked symptoms of these troubles are explained in the above description. Much pain, straddling movement, efforts to pass water, and much the same symptoms that attend inflammation of the kidneys or bladder, attend these troubles. They are, indeed, the attendants or symptoms of other diseases; though, from the evil they may do, require medicine given, or means made use of for their relief.

To ascertain whether the case is one of retention or suppression of the urine, the hand must be passed into the rectum or last gut, when the bladder will be felt lying beneath it. If the bladder is found empty, or nearly so, and soft, the case is one of suppression of the urine. But if the bladder is large and hard, showing that it has a great quantity of water in it, the case is one of retention.

Causes.—Retention of the urine is the result of strangury,

choking, or constriction of the urethra or passage leading from the bladder, at any point, and from whatever cause. It may depend on palsy of the bladder, spasm, or pressure on the neck of the bladder; stones passing out from the bladder; and is frequently present in colic, disease of the kidneys, and diseases attended with stupor. The result of retention would be, if not relieved, inflammation of the bladder and death.

Suppression of the urine may be caused by over-stimulating feed in hard work, the too free use of diuretics, and inflammation of the kidneys. It is a disease which proves fatal very soon.

Treatment.—When the urine is retained in the bladder, if the horse is laboring under colic, when that is relieved his water will generally become all right. But in most diseases causing retention their cure can not be waited for. If the disease causing the retention admits of bleeding, bleed freely; and at the same time, or a few hours after, a physic, with relaxing medicine, may be given:

Take—Powdered aloes.....1 ounce.

Powdered lobelia leaves.....1 ounce.

Warm water.....1 quart.

Mix, and give as a drench.

After relaxing the system by these means, the reaction which follows may relieve the animal.

It may be necessary to draw the water off with the instrument called a *catheter*. A gum-elastic catheter is to be used, and it is to be well oiled. It must be steadily and gently passed up the urethra or channel in the penis. If the catheter comes to a place that seems to be obstructed, it should be gently pressed against, until it passes by. In most cases the use of the catheter will be successful. But it may be necessary to perform a more difficult operation. There are two operations: one to be performed by cutting through the

skin and flesh into the urethra, a short distance below the fundament. To ascertain the place to cut through, a ca heter is to be introduced, and this can be felt at the proper place to make the opening into the urethra. After the opening is made, a tube, slightly curved, can be passed into the urethra, and on into the bladder.

The other method is to puncture the body of the bladder itself, and thus draw off the water. This is either done through the muscles of the side, or the puncture is made through the rectum into the bladder. In either case, a tube that will completely fill the hole in the bladder must be passed in for the water to pass out through.

I can perform another operation, by which the puncture is made through the neck of the bladder, and the water drawn off; but it is one that should not be undertaken by any but a thorough anatomist. It is very successful when properly performed.

For suppression of the urine, the particular disease which caused the kidneys to quit manufacturing water should be promptly treated. But as its cure can not be waited for, the kidneys must be aroused to action, or the system will very soon be poisoned to death with the urea which is left in the blood. In the first place:

Take—Powdered aloes.....1 ounce.
 Cream of tartar.....4 drams.
 Water 1 quart.

Mix, and give as a drench.

In about six hours after the above is given, commence with the following:

Take—Tincture of digitalis.....1 ounce.
 Sweet spirits of niter.....1 ounce.
 Saltpeter.....2 drams.
 Water 1 quart.

Mix, and give at one drench.

The same to be repeated, leaving out the digitalis, every six hours. It should be tried for two or three days. The horse should have flax-seed tea to drink often. If the above fail, other diuretics may be tried.

PROFUSE STALING.

A frequent flow of water, of a natural appearance, but very large quantity, is called *diabetes incipidus*, and is included, by horsemen, under the term of *profuse staling*.

But there are many things which may affect the horse, causing him to pass a great quantity of water in a short time. Anger, excitement, fear, and the like passions, will have this effect. The drinking of large quantities of water, sudden change from hot to cold air, will cause a great flow of urine.

Treatment.—An author has properly remarked that “it is the duty of every physician to know when to do nothing.” This duty is about all that need be practiced in *profuse staling*. The following treatment may be given, if thought necessary:

Take—Carbonate of ammonia.....60 grains.

Tincture of opium..... 1 ounce.

Mix, and give the above dose in a bucket of water, three times a day. To be used for several days, or until the evil is remedied.

Or the next prescription may be used:

Take—Salts of tartar..... 1 ounce.

Sugar of lead.....100 grains.

Mix, and give in eight equal doses, four hours apart. Correct the food or feeding of the animal.

THICK WATER.

There is only one form of disease which causes the urine to become of a thick, albuminous character, such as we propose considering in this article. It is of rare occurrence in the horse, though quite common in man. It is called Bright's disease, or albuminous urine. Its existence may be known by

the thick character of the water, and the peculiar gait of the horse.

But I wish it borne in mind that there are many things which cause the horse's urine to become of a thick character, and much changed in appearance. A little over-feeding, the use of improper food, bad digestion, slight cold, and many other trifling circumstances, may cause the water to become thick and ropy, but with no appearance of ill health. There can be no practice more evil than that of giving medicines to correct the water, when the horse is not laboring under any clearly-marked disease.

If it is clear that a horse is laboring under genuine *thick water*, or Bright's disease, nothing better can be done than to turn him on grass. In winter, roots may be given, with slippery-elm water and flax-seed tea, in place of green food. But avoid dosing your horses with medicines, *to correct the water*, only in cases where there is unmistakable disease. *Thick or ropy water is no evidence of disease, of itself.*

BLOODY URINE.

This disease is so named from the fact that there is blood actually passed with the urine. The blood comes from some portion of the urinary organs, but it is difficult to tell from just what part. There is generally pain in passing the bloody water, as shown by the uneasy motions of the horse. This difficulty may result from strains, blows or falls, or the passage of stones.

An appearance of blood in the urine may be present in some other diseases of the urinary organs; but if pure blood is actually being passed, it will form a clot, if a portion of the water passed is caught, and let get cold. Some diseases of the liver, and diseases of a putrid character, may cause or give rise to urine of a bloody appearance.

Treatment.—If there is much pain, give the horse one ounce tincture of opium, in one pint of warm water, as a drench.

To stop the blood, give tincture of muriate of iron, half an ounce, every six hours, in one pint of cold water. Alum, one-fourth of an ounce, dissolved in a pint of water, or one ounce of spirits of niter, every four or six hours, will have the same effect. Keep warm while using the above.

URETHRAL GLEET.

The inside or mucous lining of the urethra, or channel through which the water passes out, secretes a fluid, in health, just sufficient to keep its surface moist. This fluid is of a clear, whitish color. It may be formed in too great quantity, and then it runs from the mouth of the urethra as a ropy, white discharge. There is no pain attending this discharge, nor when the horse passes his water. Over-exercise of the generative organs of stallions may cause it.

Treatment.—Wash the penis two or three times a day with cold water. Keep the horse quiet; and, if a stallion, keep him from mares. The diet should be light—scalded shorts, with little oats and hay. Internally use the following:

Take—Balsam copaiba 4 ounces.

Sweet spirits of niter 4 ounces.

Tincture muriate of iron 2 ounces.

Mucilage of gum-arabic 1 pint.

Mix, and give four table-spoonfuls, three times a day, in water, as a drench.

A discharge of similar appearance from the vagina of the mare will yield to the same treatment: the water being thrown up the vagina with a syringe. Such affection is called, in mares, *leucorrhea*; that we have just considered, in the horse, *blenorrrhea*.

FOUL SHEATH.

The natural, oily secretion around the horse's penis, and the mucus secreted by the inside of the sheath, sometimes become dried and hardened, forming scales of an irritating character.

There is a very offensive smell attending this condition, and the horse generally has some difficulty in making water, which is owing to what is called "the bean." This is a hardened lump situated at the point of the penis, or mouth of the urethra.

Treatment.—Draw out the penis, or yard, and wash it clean with soap and water, and then grease it. Be sure to remove "the bean."

FALLING OF THE YARD.

This affection is the result of an inflammation of the *prepuce*. The *prepuce* is that dark skin which is seen when the horse's yard is drawn, to cover that part of the organ next the belly, for from five to eight inches, and which part is much thicker than that part which is uncovered toward the point. In the unexcited condition of the penis it is drawn back, or shrinks back, into the *prepuce*.

Now, if the *prepuce* becomes inflamed, it becomes drawn tight around the penis, or yard, and prevents it from receding back properly; hence the yard is held partly out. If the inflammation is very high, the *prepuce* becomes very much swollen, and often becomes permanently thickened and enlarged. In this case the penis is strangled, or choked, by the *prepuce*; and the part of it which protrudes, or sticks out, becomes enlarged, or swollen, constituting what is commonly termed *falling of the yard*. A loss of muscular power in the penis may allow the organ to hang loosely out. This is called *falling of the yard*, also, but is attended with no swelling or inflammation about the *prepuce*.

Treatment.—The horse should be kept perfectly quiet; and if the disease is recent, and there is much inflammation, give a good physic:

Take—Powdered aloes..... 1 ounce.

Podophyllin 20 grains.

Cream of tartar..... 1 ounce.

Mix, and give in a pint of warm water, as a drench.

Cloths, wet in cold water, are to be bound to the part by a broad bandage around the flanks, to which are to be fastened two other strips of cloth under the belly, and one of these to be brought up between the thighs, and over the hip, to be fastened to the other bandage around the body on the back. The other is to be similarly applied. The cloths must be wet often with cold water and tincture of arnica.

If this does not reduce the inflammation, or, if the case is one of long standing, an operation must be performed. The prepuce is to be split, so as to relieve the strangled condition of the penis. The incision, or cut, should be made along the upper or forward side of the prepuce, and up as high as the constricted ring of prepuce extends. This ring should be entirely divided, which is choking or strangling the penis. If any artery is cut, apply lint and tincture of muriate of iron to it, if it is small; but, if large, tie it. After the operation, apply cold water, dressing as above described.

The other form of falling of the penis, depending on want of muscular power, admits of no relief, except amputation of the penis.

NERVOUS DISEASES.

MEGRIMS, OR VERTIGO.

THIS is an affection of the brain, occurring, generally, in horses that are well fed and in good condition, and more frequently when doing fast work.

Symptoms.—The horse may be performing his work with ordinary ease, manifesting no signs of ailment; commence jerking his head, or bobbing it up and down, and then, suddenly, or after a few clumsy steps, stops short, showing evident signs of dizziness, and in a few minutes resumes his work. The

attack is not always this mild, however. He may fall as suddenly as if shot, or rapidly and senselessly run around a few times, and then fall. He may either lie quite insensible, or struggle with great violence. In a short time (perhaps five to ten minutes) he will begin to recover, and will soon get up, and proceed to his work, but not without some appearance of heaviness and fatigue. He may never recover from the attack, and die on the spot. A horse that has had an attack will be very liable to the difficulty again. It is a disease not only dangerous to the horse, but also to the driver or rider. Prudence would dictate that a horse that has had an attack should not be used under the saddle, or to the carriage or buggy.

Causes.—Any thing that will interfere with the free return, through the veins of the neck, of the blood sent to the head by the arteries, may occasion megrims. It is caused, to speak in common language, by “a rush of blood to the head.” The arteries send more blood to the head than the veins can carry away. Violent exercise, when the weather is hot, causes the blood to be sent to the head with too great force. A collar too small, the throat-latch too tight, or the curb-rein too tightly drawn, will obstruct the return of the blood from the head, and thus cause it to be, as it were, partially dammed up in the blood-vessels of the brain, thus causing pressure on the brain; and which, either partially or wholly, prevents it from acting on the system to supply that nervous force which is the cause of all action of every kind.

Treatment.—Immediately when the attack occurs, three or four quarts of blood should be taken from the neck-vein, if any one is handy who can bleed. But, if not, any person can bleed the horse in the mouth by cutting the bars of the palate with a knife. For performing this operation, see the article headed “*Bleeding*.” After the attack is over, he should be gently used and slowly driven, until he reaches home; and then a good physic given, and the horse put on soft feed, or turned on grass. He should not be worked until the over-distended blood-vessels

have regained their usual tone or strength, or apoplexy may be the result.

APOPLEXY.

Apoplexy is a very fatal disease, and, like megrims, is generally met with in horses of a full habit; that is, such as are disposed to become too fat, with a very great amount of blood. It consists in a powerful flow of blood to the head, causing great pressure on the brain, often rupturing blood-vessels within the cavity of the head or skull, and, of course, causing the horse to fall.

Symptoms.—Very little warning is sometimes given, the animal dropping as suddenly as if a ball had passed through the heart, and he is quite dead. It may attack him in the stable, in the field, or at work. Commonly some warning of an approaching attack of apoplexy is given. The horse will hold his head down nearly to the ground, as if deaf or blind; twitching, or checking back, as if something were before him; and, when he goes to move, his gait will be swaggering, like a drunken man. He may continue in this condition for several hours, but the symptoms of engorgement of the brain become more severe until he falls. The pupils of the eyes become more dilated; the eyes staring and vacant; the teeth grind together, sometimes crushing the tongue; the veins of the neck full, and the pulse slow and full; the breathing oppressed, or snoring; twitching of the muscles; strong convulsions finally set in, and the animal dies, in a state of what is called *asphyxia*, which is a want of aeration in the blood, causing it to become loaded with carbonic acid.

Causes.—The immediate cause of apoplexy—that which, at the moment, produces the attack, is pressure on the brain, produced by the congestion of its blood-vessels, or the watery portion of the blood (the serum) escaping through the coats of the veins, or their small terminations, (the capillaries), and forming collections of watery fluid about the brain; or by the

rupturing of blood-vessels, causing the blood to escape into the cavities of the brain; or by tumors within the skull pressing on the brain.

The causes which predispose to the disease are, any thing that will have a tendency to weaken the blood-vessels of the brain, or occasion too great a flow of blood to that organ, or prevent its free return from it; too high feeding without proper exercise; feeding too stimulating food, as corn, in hot weather; improper gearing, as too tight a collar; and keeping the head reined too high.

Apoplexy may be distinguished from megrims, by the attack of the latter usually coming on suddenly, and the horse getting up in a few minutes, comparatively well. In those cases in which both diseases prove immediately fatal it might be difficult to tell which disease had done the work; and, indeed, I think the distinction, in such cases, is almost, if not quite, without a difference. A careful attention to the symptoms of the case, and the previous feeding, working, etc., of the animal, will enable any one to distinguish between apoplexy and either mad staggers or stomach staggers.

Treatment.—This will be divided into two parts: First, the treatment during the attack; and, second, after it is over, to prevent a return. As soon as the attack is observed, a large quantity of blood should be drawn from the neck-veins. Both veins should be opened; the orifice, or opening, should be made large, so that the blood may flow rapidly, and as high up on the vein as possible. From six to eight quarts of blood should be taken, or continued till he almost drops down or faints. As soon as it can be got down, a thorough physic should be given. The following will answer the purpose:

Take—Barbadoes aloes.....	1 ounce.
Castile soap, scraped.....	1 ounce.
Ginger, pulverized.....	2 drams.
Warm water	1 pint.

Mix, and give as a drench.

Assist the operation of the physic by giving the following injection :

Take—Thick soapsuds.....1 gallon.
 Common salt..... $\frac{1}{2}$ pint.
 Mix. Throw it up the bowels with considerable force.

I give another formula for a cathartic, that may be used in place of the above:

Take—Croton oil.....20 drops.
 Crude mercury..... 5 grains.
 Warm water..... 1 pint.
 Mix, and give as a drench.

When no one can be found soon who can bleed in the neck, the following course should be pursued: Let a person station himself as high above the horse's head as possible, and pour a stream of cold water on the head, until signs of recovery are observed; and, after this, continue the pouring in a smaller stream, or stopping for short intervals, just so as to keep the head quite cold. The physic and injection must be given as soon as possible, and the horse bled as soon as it can be done. The application of a stream of water, even when the horse has been immediately bled, will be of benefit. But whatever is done, many cases will be fatal, as the blood-vessels of the brain are often broken in the early part of the attack.

If saved from the first attack, the horse should be moderately fed, and his system kept from becoming too full, by an occasional bleeding and physicking; should not, for several months, be put to work again; and should never have a tight-bearing rein on him.

EPILEPSY, OR FITS.

This is a convulsive disease which occasionally happens the horse. It resembles the common fits of the human family.

Symptoms.—The animal stops, trembles, looks vacantly

around him, and staggers and falls, or falls suddenly. The convulsions which follow are sometimes slight, but at other times they are terrible. The head and forward part of the horse are very strangely turned and twisted in the attack. The convulsions pass off in a few minutes, and the horse gets up, looks foolishly around, passes water, and eats and drinks as if nothing out of the way had happened.

It is very difficult, if not impossible, to discover the cause of epilepsy, and, without this knowledge, no attempt need be made to cure the patient. There is but little if any hope of effecting a cure. A horse subject to fits is almost entirely useless, as he is unfit to ride or drive, from the danger to which one would be exposed in using him.

HYSTERICIS.

This is a nervous affection of mares, and occurs most frequently in those that have not been with foal, and such as have had colts and been denied the services of a stallion. It occurs at about the time the mare is in season. It very closely resembles the same disease in women.

Symptoms.—During the period of heat, or shortly after, the mare is seized with a paroxysm or fit; she falls to the ground in the greatest excitement; her limbs are stretched out stiff and rigid; the muscles of the entire body tremble rapidly; the flanks sweat; the breathing is rapid, but not snoring, as in apoplexy; the hind limbs are paralyzed, and the pulse is rapid. After lying in this condition for a few minutes, the symptoms abate, and the mare becomes more quiet. After awhile the muscles regain their power, and she gets up, but not without some trouble. After rising, she seems much better, but very excitable, and seems to want to get out of the lot she is in. The least noise sets her in the wildest excitement. She may continue up for some time, and then take another fit; or the paroxysms may come on very rapidly, soon causing disease of the brain and death.

Hysterics, properly called hysteria, may be mistaken for inflammation of the womb. Inflammation of the womb occurs a few days after foaling, or after abortion. It is attended with symptoms of high fever, with no abatement. No "*fit*" occurs in inflammation of the womb. On opening the bearing, the parts will be seen red and swollen in inflammation of the womb. There is no twitching of the muscles about the anus or fundament, which occurs in hysterics.

Causes.—Derangement of the reproductive or genital organs of the mare is regarded as the cause of those violent nervous symptoms which constitute hysterics. I can not doubt but it requires a combination of causes to produce an attack of hysterics. Indigestion, over-stimulating food, want of proper exercise and pure air, the teasing of a gelding, being denied the services of the stallion, the temperament of the mare, are circumstances and conditions which may cause an attack of hysterics.

Treatment.—If the mare is in heat, or season, I should certainly allow her the services of a horse. She could not have a better antispasmodic.

When the mare is down with a fit, an injection of a pint of warm water, a handful of salt, and two ounces of tincture of asafœtida may be given; the legs, at the same time, rubbed briskly. After she gets up, she should be removed to a perfectly quiet place, and the following given:

Take—Tincture of asafœtida.....	1 ounce.
Tincture of castor.....	1 ounce.
Sirup of garlic	2 ounces.
Thin gruel.....	1 pint.

Mix, and give as a drench. To be repeated every six hours until cured.

Let the mare be turned on grass for awhile, or allow her moderate diet—bran mash and hay, with little oats.

LOCKED-JAW, OR TETANUS.

Tetanus is a nervous affection, characterized by a more or less permanent contraction, spasm, or cramping of the voluntary muscles; most particularly observable in those of the jaws and neck. It has received the name of *locked-jaw*, from the fact that the muscles of the jaw are the first to become powerfully affected, presenting one of the most alarming features of the disease—inability to chew or swallow.

Symptoms.—Tetanus may come on quite suddenly, but more frequently it is slow and insidious in its approach. The horse may appear rather unwell for a day or two; does not feed as he should, only partially chewing his food, and manifesting considerable difficulty in swallowing; and gulps his water, and appears agitated. There may also be symptoms of stiffness of the muscles of the neck, and of the head and face, and even the eyes may begin to show an unnatural expression of squinting or drawing back. Any of these symptoms being observed an examination should be made, for the success of treatment depends much on the stage of the disease at which it is commenced. The earlier the better. If the case is one of tetanus, the jaws will be found stiff, and only admitting of being opened a little way; or, perhaps, firmly closed; the muscles at the side of the jaw being rigidly contracted, presenting perfectly hard lumps or ridges. Very soon the muscles of the neck will become quite stiff, so that the head can not be turned without considerable difficulty; the ears become stiff and fixed; the eyes are drawn far back, squinting outward, and the brow drawn far over the eye; the lips and nostrils become contracted; the head is extended forward; the fore-feet are set forward and wide apart; the abdomen or belly is tucked up; the back and loins stiff; if the tail is not too heavy, it is raised and trembling; the hind legs are rigid and straddling; the whole body becomes stiff and immovable; the breathing laborious, and still more so as the disease progresses; the pulse is not always

affected at first, but becomes quick, small, and irregular; the expression is indicative of the most excruciating pain and agony. Sensibility and perception do not appear to be destroyed, or much impaired, for, when he is as immovably fixed as a statue, his pulse quickens at the approach of any thing that would excite fear. These symptoms may continue for a week or ten days; until the powers of life give way under the continued exhaustion of hunger and pain; and not until in the very embrace of death does any relaxation of the universal spasm take place, and the poor sufferer yields the victory to the grim conqueror only after having reached the extreme of vital endurance.

Causes.—It is well known that all muscular movement is produced by a stimulus imparted by the nerves called nerves of motion. This stimulus is supposed to originate in the brain, and is sent from it along the nerves to the muscles which it is intended to excite to action or cause to contract. This stimulus is sent to all muscles by an effort of the will; except certain muscles which act independent of the will, as those of the heart, lungs, etc. Now, if the nerves are so diseased that the animal loses control of this stimulus, and it continues to flow without restraint to the muscles, a continued and powerful contraction of the muscles will be the result. And this seems to be the case in tetanus. All the muscles of the system, however, do not become tetanic at once. The animal loses control of them as the nerves leading to them become involved in the unhealthy state, whatever it may be. Tetanus is just the opposite of palsy or paralysis, which is an entire cutting off of nervous stimulus, depriving the muscles of motion or power to contract. This is, we think, the immediate cause of the contraction of the muscles. But the question arises, "Whence comes this nervous derangement?" Does it take place as an original disease, or is it symptomatic? These are questions which have puzzled the deepest investigators, and about which there have been various opinions entertained.

It is universally acknowledged that injuries, as cuts, punctures, surgical operations, whether properly or improperly performed, the driving of nails into the sensitive parts of the foot in shoeing, etc., may be followed by tetanus. Nor does the extent of the injury appear to make much difference, the slightest puncture often being followed by it. Neither does the degree nor extent of inflammation seem to have much to do in the case. The attack may come on soon after the injury, or not until it has quite healed, and perhaps not for some time after.

But I think it equally true that tetanus often occurs without any local injury—exposure to cold, as standing in the rain, hitched to a horse-rack, after brisk exercise; being worked until very hot and sweating, and suffered to stand in the wind and become chilled. Fatigue and hunger may give rise to it.

Some writers think that a derangement of the digestive organs is always present, to produce such a degree of nervous irritability as would cause tetanus to arise from such trivial injuries as often seem to cause it. I am certainly of opinion that there must be some derangement of the system, or of some part of it, to make the very same injury produce tetanus in one case, which, in a hundred other cases, under apparently entirely similar circumstances, would cause no inconvenience. And this, I think, will be found located in the spinal cord, the great nerve from which all the voluntary nerves are given off. This nerve is supplied with its investing membrane and blood-vessels, and hence is liable to irritation and inflammation, just as the brain, from which it springs, is. Now, if a degree of irritation exists in this cord, it is, necessarily, in a high state of excitability, and a very slight disturbance of one of its smallest branches would be reflected to it, and produce a most powerful effect upon it. This I conceive to be the true cause of tetanus: an irritation of the spinal cord, greatly exalting its sensibility, so much so, that, from even the slightest disturbance, its action may rise entirely above the control of the brain.

Treatment.—The object of the treatment is to relieve the spasm and prevent its return. In the first place, bleed from ten to twelve quarts; then apply a handkerchief to the nose, wet with chloroform, until the jaws relax; then have ready, and give the following:

Take—Laudanum 2 ounces.
 Tincture of asafetida 2 ounces.
 Chloroform 2 ounces.
 Warm water.....1 pint.

Mix, and give as a drench. This is to be repeated every four hours, until the horse seems well.

After this, use the following:

Take—Powdered asafetida.....2 ounces.
 Cream of tartar.....3 ounces.
 Capsicum.....1 ounce.
 Carbonate of iron.....3 ounces.

Mix, and divide into twelve parts, and give one every night, in thin gruel, as a drench.

Let the horse have plenty of salt. From the first, the horse should be well blanketed, and the legs rubbed with alcohol and Cayenne pepper. The spine should also be rubbed with the same. A poultice of lobelia herb, boiled with bran, should be bound on so as to cover the under-jaw and come well up on the sides of the cheeks. It may be kept moist by occasionally pouring a little warm water on it. The diet of the horse should be light and easily digested. He should be kept quiet, and in a comfortable stable.

Locked-jaw often results from wounds. In such cases, the wound should be carefully examined, and any splinter, shivers of bone, or any thing of the kind, removed.

Put a mustard poultice all along his spine, (back).

PALSY.

This is the complete or partial loss of power in the muscles of some part of the body. There are three varieties met with:

the first affects the muscles of one side of the body; the second affects those of the hind extremities; the third affects the muscles of the face—generally only one side. Also, certain internal organs become paralyzed for a short time, as the bladder, rectum, etc.

Symptoms.—When a horse is attacked with paralysis of one side, called *hemiplegia*, if it is complete, he falls on that side and is unable to rise; but if it is only partial, he stands still; or if he attempts to move, the limbs of the affected side are only dragged along. The sense of feeling is lost in the affected part. If the hind parts are affected, called *periplegia*, the horse falls on his haunches, like a dog, and, for a time, makes great efforts to get up, but finding his labor unavailing, he becomes resigned to his fate, and drags his hind parts along. He loses control of his bladder and bowels, and their contents pass off involuntarily. Partial palsy affects the muscles of one or both sides of the face, which is generally drawn upward, and the horse presents a hideous countenance.

Causes.—Derangement of the nerves is the cause of palsy. The nerves lose their power over the muscles. Derangement of the digestive organs may cause palsy. Injury of the spine, by falls, blows, kicks, etc., may injure the spinal cord, and cause an attack of palsy. Palsy of the face is sometimes a symptom of apoplexy. The exact cause of this, like most other nervous diseases, is not well understood.

Treatment.—But little can be expected from any remedy in a case of palsy, resulting from injury of the spinal cord. Draw a large blister over the loins, or the seat of the injury, bleed freely, and give a physic. After all symptoms of inflammation have disappeared, give tincture of *nux vomica*, one dram at a dose, twice a day; the dose to be gradually increased to two drams; to be given in water, as a drench, or, if the horse is thirsty, it may be given in a bucket of water.

Where the disease is probably dependent on derangement of the digestive organs, put the horse on the treatment recom-

mended for indigestion, and blister the full length of the spine. After the blister heals, use the following liniment, twice a day, along the back:

Take—Capsicum.....2 ounces.
 Alcohol.....1 pint.

Mix. This is very powerful.

After all symptoms of inflammation that may have attended the case have passed away, use the tincture of nuxvomica, as above directed.

Palsy of the face, which is a mere symptom of congestion of the brain or apoplexy, will best yield to the treatment for such disease.

CRAMP, OR SPASM OF THE MUSCLES.

Cramps, such as attack human beings, also affect the muscles of the horse. The muscles of the limbs are most liable to be the seat of cramp. The horse is unable to move the limb, and, when compelled to move, he goes on three legs. The limb is often so forcibly drawn up that the joint will crack. If traveling, he may become very lame for a few steps, and then go on all right again.

Horses that are illy-fed, or half-starved, are generally the subjects of cramp. There is not enough stimulation furnished the nerves by the blood.

Treatment.—When the attack occurs, the limb should be briskly rubbed, and the horse made, if possible, to bear his weight on it. The object, then, is to prevent its returning again. The diet should be wholesome and nutritious; he should have good stabling and pure air. He should have “flax-seed jelly” twice a day. To improve his digestion:

Take—Golden-seal, powdered.....2 ounces.
 Poplar-bark, powdered.....1 pound.
 Ginger, powdered.....1 ounce.

Mix, and give one table-spoonful three times a day.

Give him salt, freely, every day. Good grooming, rubbing the legs thoroughly, is necessary.

STRINGHALT.

This is a peculiar twitching-up of one or both of the hind-legs, when the horse is in motion. This awkward motion is generally well known; but the cause of it is not satisfactorily understood. The peculiar jerking-up of the leg, when the horse only intends to raise it in the ordinary way, corresponds nearer to the action of the limbs of a patient laboring under a mild attack of St. Vitus' dance than any other muscular action of which I am aware. It is evidently a nervous derangement. The animal has power to put the muscles in action, but, for a moment, loses the power of controlling that action, but then regains it again sufficiently to bring the foot down again. It is certainly a derangement of the nerves supplying the unruly muscles which produces it. But it has not been clearly ascertained what muscles are thus partially uncontrollable.

What particular causes will bring on an attack have not been pointed out. Stringhalt is unpleasant to the rider, and must certainly interfere with his sureness of foot, and unpleasant to those who see his movement. Yet the serviceableness of the horse may not be greatly impaired. Youatt does not regard stringhalt unsoundness.

Treatment.—I have but little faith in any treatment for this difficulty. If any would be of use, it would most likely be counter-irritation along the spine, about the small of the back, together with rest, and medicines to strengthen the nerves internally. But as the ailment does not greatly injure the usefulness of the horse, I can hardly recommend treatment with so little prospect of success.

DISEASES OF THE EYE.

THE eye of the horse is of peculiar interest. However perfect in other regards, if his eyes are defective, he is unsafe for nearly every purpose, and comparatively valueless. And a blind horse, whatever may be the symmetry of his proportions, is an object upon which we can look with no sensation of delight, only with a certain shrinking of pity; he is robbed of every grace and beauty of life.

There are several distinct affections of the eye of the horse, which I shall describe separately, and present the best treatment known to the veterinary profession. And in recommending treatment for this important organ, I am sorry that I can not speak with that confidence which I have in the treatment of many other diseases. It is no use to disguise the fact, that many cases of disease of the eye will go on to a fatal termination, despite of any thing that may be done. But, fortunately, those affections which are the most fatal to this important organ are almost entirely the result of gross carelessness in the breeder, or palpable and criminal mismanagement of the horse, and can, almost entirely, be prevented from occurring, by attention to breeding to horses with sound eyes, and by observing the laws of health in working, feeding, stabling, etc. The affections of the eye, usually recognized, are, inflammation of the eye, or *ophthalmia*; specific or periodic ophthalmia, called moon-blindness, cataract, amaurosis, gutta serena or palsy of the optic nerve. There are other minor and secondary difficulties, as haws, called "hooks," warts about the lids, and a scaly, itching eruption on the edges of the lids.

COMMON INFLAMMATION OF THE EYE—OPHTHALMIA JUNCTAVO.

This is a true inflammation of the conjuction, which is a thin membrane that lines all of the front part of the eye, and a fold of it covers the haw, and also lines the inside of

the lids. It is very full of blood-vessels, and, when inflamed, becomes swollen and red.

Symptoms.—An attack of inflammation of the eye is often the result of cold, and in such cases presents at first only the ordinary symptoms of that affection. But very soon the eye will be found to be more than ordinarily affected; the inside of the lids will be red, and streaks of red will be observed over the white in the corners; the eyes will look “bloodshot;” the lids will be more or less swollen, and partly closed, with weeping or the dropping of tears; and if a stream of light is suddenly let upon the eyes, they will be spasmodically closed. Much the same appearance will be present whatever may be the cause of the inflammation. The general health of the horse will be but little affected; he will eat well, and perform his ordinary work with his usual spirit.

Causes.—This, as well as all other inflammatory affections, is often the result of cold or exposure. It may be produced by hay-seeds, sand, or any foreign substance getting into the eye, beyond the reach of the haw to wipe it out. Blows on the eye, kicks, etc., may be the cause.

Treatment.—First ascertain the cause by a careful examination, and, if any thing is in the eye, take it out. To do this, take a silk handkerchief and wrap two or three folds of it firmly over the end of a large knitting-needle, and pass it under the lid and make a sweep toward the corner of the eye, and of course over the place where the offending matter seems to be lodged.

A long bristle, bent so as to form a loop, and this loop passed under the lid beyond the mote, and then the lid drawn down and pressed on, and the loop withdrawn, will remove any thing from the eye.

The horse should be kept in a rather dark stable, and have light food.

If the inflammation does not subside after removing the foreign substance, if any is found, or if it results from other

causes, it will be proper to bleed and physic. At the same time put a rowel about two inches below the eye.

The following wash may be used once or twice a day :

Take—Sulphate of zinc	10 grains.
Sugar of lead	20 grains.
Loaf-sugar	1 dram.
Rain-water	1 quart.

Mix, and wash the eye with the liquid.

If a coat or film is appearing on the eye, I have found the following preparation to almost invariably remove it. It is very severe, but is as near a universal remedy for the eye as can be found. It may be used in any case that is very obstinate. Notwithstanding its severity, I have never known any harm to result from its use. Take an egg and break the end of it, and pour out the most of the white, then break up the yellow, and stir in with it enough salt to make a stiff mass. Then set the egg on the hot coals in the fire, cover with coals, and let it remain until it is perfectly charred, or until it quits blazing; it is then to be removed from the fire and reduced to a perfectly fine powder, and kept in a well-stopped bottle. A portion of this is to be put in a quill and blown into the eye once a day.

“HOOKS,” OR INFLAMMATION OF THE HAW.

This is an affection of a part of the eye, being an inflammation of the *haw*. This difficulty seems to be thoroughly understood by almost every body, quite as well as they understand “*bots*.” And the eye of a horse can hardly become affected, but some wiseacre examines it, and, seeing the haw, (which is always present, and is a very necessary organ, as we shall see), pronounces the case “*hooks*,” and recommends that they be “*cut out*”—the great and universal remedy. And the owner, feeling “that something has got to be done,” and being ignorant of the structure and nature of the diseases

of the horse's eye, gives his horse over into the hands of this miserable, pretending gouger, to be "cut for the hooks." There is no doubt but many a fine horse has been subjected to this barbarous and foolish operation when the haw was not at all diseased, and thus injured for all future time; as, indeed, a horse always is, after this unnecessary operation. I can not too strongly speak against the popular practice of blindly tampering with the best servant of man; which, however, the intelligent and humane owner will not do himself, but he only shifts the responsibility, by permitting the most ignorant of the neighborhood, who have neither interest nor humanity at stake, to do so. How much better, in this country, where well-informed veterinary surgeons can not be got, except in some of the larger cities, that every farmer or owner of a horse should inform himself on this subject; or, at least, take the precaution to have some reliable means of information convenient, which will enable him to ascertain the difficulty and apply the proper remedy.

In order to explain fully the difficulty called *hooks*, and to show how injurious is the practice of cutting for it, it will be necessary to call attention to the structure and use of the *haw*. This is a triangular or V shaped, cartilaginous (gristly) structure, situated at the inner corner of the eye, between the eyeball and side of the socket. The short side of this triangle is thinned down to quite a sharp edge, and looks outward, or toward the sight of the eye, while the sharp angle is far back in the corner of the eye. The haw is concave on its under side, next to the eye, and convex without, so that it fits close to the ball; it is covered with a thin fold of membrane, of the same that lines the ball of the eye and the inside of the lid, so that it may move smoothly over the ball of the eye. Now, the use of this is to pass rapidly over the ball of the eye whenever any dust, bug, sand, or any thing else gets in it, and thus wipe it off. The haw has no muscle attached to it, to draw it forward over the eye, but its movement is

affected by another very peculiar arrangement. Behind the ball of the eye, in the cavity of the socket, there is a large quantity of fat, and this extends up into the inner corner in quite a large lump. This fat is not like the common fat of the body, for it does not waste when the horse is in low condition, nor increase when he is in high condition. This fat is very elastic, and, when pressed upon, it slips from under the pressure, and as soon as the pressure is removed, instantly returns to its place again. There is attached to the ball of the horse's eye a muscle peculiar to quadrupeds or four-footed animals; and the use of this muscle is to draw the eye back into the socket on the approach of the least danger. Now, whenever this muscle acts, it draws the eyeball back, and it presses on the fat behind it, and causes it to crowd out into the inner corner of the eye, against the sharp angle of the haw, which also is tipped with a little ball of fat, and by this means the haw is made to dart over the ball of the eye with the rapidity of lightning; and, as the ball of the eye is oval in shape, as soon as the muscle which draws the eye back relaxes, the fat returns to its proper place, and the haw darts back to its hiding-place, carrying on its upper surface the tears, dust, or whatever offending matter might have lodged on the eye. But as this might do mischief if allowed to go down the little tube in the corner of the eye, leading to the nose, they are wiped off on the outside. Thus we find the haw to be the horse's pocket-handkerchief, or washer of the eye, and of great service to him, being the only means of protecting his eyes from the irritation of the dust, etc., through which he has to travel, as well as protecting him from the liability to several diseases of a very unpleasant nature.

We are now prepared to give a sensible explanation of the great "bugbear" called "*hooks*," and to hold up to the deserved contempt of sensible people those miserable *gougers* who are always ready to "*cut out the hooks*," (the haw), whenever, from any cause, it is brought within their reach.

Whenever the horse's eye becomes inflamed, or irritated and tender, from any cause, the light, or even the wind, will hurt it, and then the peculiar muscle, before described, contracts a little and holds the eye back, pressing the fat, and causing the haw to project out a little distance. Or the haw itself may become inflamed, and become thicker and larger, of course, than natural, and by this means made to project a little. This irritation of the haw is, in many cases, only temporary, being the result of sympathy with other parts of the eye in a state of irritation.

Treatment.—If the protruding of the haw is caused by any other disease of the eye, or by any disease that makes light painful to it, causing it to be drawn back, the proper treatment for that disease should be applied, and when it is cured, the haw will get well and return to its proper place. If the haw itself is inflamed, the horse should be bled three or four quarts, and a cooling physic given. Apply the following lotion to the eye:

Take—Sugar of lead.....2 drams.

Rain-water 1 pint.

Dissolve the sugar of lead in the water.

Apply this to the eye as a lotion, or wash, three times a day, with a clean piece of muslin.

Sometimes the following will do better:

Take—White vitriol (sulphate of zinc)..... $\frac{1}{2}$ dram.

Rain-water 1 pint.

Mix and dissolve. Use the same as the preceding one.

There is no necessity of ever cutting out the haw, unless it should ulcerate, which very seldom happens; and even then, by proper treatment, the ulcer may be cured without an operation.

CATARACT.

There are two species of this difficulty; one being a diseased condition of the lens of the eye, and the other the formation of a false membrane over the lens, either of which will produce blindness.

Symptoms.—Cataract will often not be discovered, especially by a careless owner, until a difficulty of vision is made obvious, by the horse exhibiting the usual indications of blindness. But it will usually be found to commence by a speck, of a radiating appearance, like the rays of the sun, forming on the lens of the eye, seen through the pupil, either near the center of it, or at the upper or lower edge. This speck may continue to increase until it entirely covers the pupil, causing it to appear of a uniform whitish color, and causing complete blindness; or it may never advance further than a mere spot, more or less obstructing vision, as it may happen to be near to or remote from the center of the pupil.

A cataract may be distinguished from amaurosis, (palsy of the nerve of sight), by the permanently dilated and bright appearance of the pupil in the latter, and the speck of white, or entire white, within the pupil, as described in cataract. A cataract may appear only in one eye, or in both.

Causes.—Any thing that will give rise to a chronic (continued) irritation of the eye may produce cataract. Irritation from exposure of the eye to intense light is very liable to cause it.

Treatment.—Veterinary surgeons do not seem to agree very perfectly as to the curability of cataract, or, rather, as to the propriety of operating for it. We have no faith in any thing but an operation for this difficulty, unless it be discovered when a mere speck has formed on the lens, when its growth might possibly be stopped by putting the horse on grass, in a shady or wood pasture, and giving him what is called alterative treatment—such as any of the alteratives named under that head, in the *materia medica* part of this work; and, at

the same time, using any of the usual mild, stimulating eye-washes, to reduce any irritation of the eye.

There are two different operations: one to be performed when the lens itself is the seat of the disease, and which is called *extirpation of the lens*, and consists in removing it; the other, called *couching*, consists in passing a pointed instrument, a couching-needle, in front of the lens, and pressing down the false membrane from before the lens.

The former operation is quite useless, as a double-convex lens, or glass, would have to be worn after it, which would be impracticable with the horse. The latter may be very successful, and will justify having it performed. An experienced oculist, or veterinary surgeon, alone can tell which operation would be required; and such alone can perform it. On account of the retracting of the eye by the muscle, whose office it is to draw it back, the operation could not be performed without the use of chloroform, but by administering it this difficulty is entirely obviated.

AMAUROSIS, OR GUTTA SERENA.

This affection is commonly called *glass-eye*, and is characterized by a total loss of sight, without any known previous affection of the eye. It may affect either one or both eyes.

Symptoms.—The symptoms by which we may distinguish this difficulty are not very numerous, but sufficiently characteristic. The owner or groom will first be led to suspect some difficulty of the eye from the movements of the horse. On examination the pupil (the sight of the eye) will be found permanently dilated; will not contract in the strongest light; the horse will take no notice of any motion toward the eye; he is “stone-blind” in the affected eye or eyes. The peculiar, glassy brightness of the eye renders it unmistakable.

Causes.—Amaurosis is a palsy of the optic nerve, which conveys the impressions of objects to the brain, to produce the sense of sight; or of the retina, which is the broad expan-

sion of this nerve at the back of the eye, on which the impression of objects falls. It may be the consequence of staggers, apoplexy, or be produced by tumors pressing on the nerve, etc. It may be sympathetic, resulting from disease of other organs, as indigestion or debility.

Treatment.—Some authors make a general sweep on this point, and pronounce gutta serena incurable. And though our own experience has not been extensive in this disease, we see no reason why it might not be as curable as the same disease in the human patient, or nearly so, at least. There are, however, well-authenticated cases of cure; but they have, doubtless, been such as were the result of mere functional derangement of the optic nerve, resulting from other diseases or debility; being only symptomatic, and not connected with positive disease of the nerve, nor the consequence of disease of the brain. These cases may certainly be regarded as incurable. If any thing could be done, it would be by setons under the jaw, and, twice a day, passing a current of electro-magnetism along the course of the nerve; placing one pole of the battery by the eye, below it, and the other at the butt of the opposite ear.

If the horse is in high condition, his feed should be reduced somewhat, and a physic given once or twice a week.

Take—Aloes, pulverized.....	4 drams.
Prickly-ash bark, pulverized.....	2 drams.
Common salt.....	1 ounce.
Warm water.....	1 pint.

Mix, and give as a drench.

The head should be frequently sponged with cold water. But if the case is one of debility, rather an opposite course will be required. Tonics (strengthening medicines) and alteratives (such as act generally, improving the system) will be proper.

BLINDNESS.

Under this head I shall consider those cases of blindness not immediately resulting from active disease. Blindness, as remarked in my hints on breeding, is hereditary to a great extent; but not, as some imagine, to the extent of the horse becoming blind without any other cause. The horse inherits a predisposition to the disease, and it, therefore, only requires a moderate amount of exposure to those influences calculated to affect the eyes to develop blindness. Blindness is by no means an affection to which the horse is peculiarly liable in the state of nature, for the undomesticated animal is hardly ever affected with it. The offspring of one horse will go blind as soon as exposed to the exciting cause, while those of another horse, by the same mares, will resist such influences, and never become blind.

It is impossible to calculate the influence of bad management in producing blindness. But, after reflecting on the exposures to which horses are subjected in many parts of the country, the wonder will not be that so many horses go blind, but that any of them should retain their sight. It is no uncommon thing, on stepping into a stable, to be greeted by an effluvia, rising from the dung and urine accumulated around the horses' stalls, so strong as to occasion smarting of the eyes and even of the nose. In such places, the horse has no chance to lie down except in his own excrement, a thing which, from his natural sense of decency, he abhors to do. In other cases, the horse is constrained to stand in a close stall, with his hind-feet on a pile of manure, perhaps two feet above his fore ones, and if he lies down at all, it is in the same uncomfortable position, and when once down, he can hardly get up again. If the inhumanly careless owner were put to sleep where every thing under him was wet and of the most offensive character, and with a pair of pillows under the lower part of his body, he might learn sympathy for his poor, faithful

servant. But this is not the only punishment inflicted; for, in addition to the accumulation of manure in the stable, constantly emitting irritating gases which affect the eyes, these stables are generally kept so tight that no fresh air and no ray of light can enter them; and when the horse, after being confined in this loathsome dungeon, comes into the light, he shrinks from it with pain. And the poor animal, if he could only speak, would doubtless exclaim, "Better to dwell in the midst of alarms than live in this horrible place."

The great majority of horses that go blind will be found to have been kept in such places, and, perhaps, overworked at the same time. A signal loss is even attendant on such a course; for, in addition to the liability of the horse to take inflammation of the eyes and become blind, it takes more feed to keep him, and he can not perform near the amount of labor he otherwise would. I have traveled in several States of the Union, as well as in different parts of Europe, and have found that, where horses are properly stabled, fed, and worked, blindness is seldom known. Whereas, where they are kept in the dark, filthy, and illy ventilated hovels before referred to, nearly one-fourth of the horses become blind, and many others affected with weakness of the eyes.

Such cruelty to a valuable animal like the horse should call down the contempt of community, and even be punished by the penalty of the law. No man is justified in thus destroying an animal.

Treatment.—Very few of these cases of blindness are at all curable. The cause of the difficulty must be removed, the horse restored to a state of nature, as nearly as possible, and when the proper medicine given, such as the case may indicate. But little prospect of curing such cases can be entertained. I am of the opinion that more good will be accomplished by giving the horse ten grains of calomel, three times a day, with a small quantity of bran, than by any other treatment. In most of such cases there is a deposit of what is called coagulable lymph in the dark part of the eye, causing

it to become of a milky-white color. Mercury is a solvent of this, and, by continuing its use for a long time, the white or milky appearance of the eye may disappear, and sight return.

SKIN DISEASES.

FALLING OFF OF THE HAIR.

THERE are a number of skin diseases which cause the falling off or destruction of the hair. Some of them are described elsewhere. The disease I propose considering here occurs in two forms: the one called humid or moist *exanthema*, and the other dry *exanthema*. The disease is first noticed in the form of little blisters, or vesicles, which pour out a fluid that dries up, leaving hard scabs, which are replaced by small ulcers, that finally deepen into the skin to such an extent as to destroy the roots of the hair. Very great itching attends the disease, causing the horse to rub himself severely, even rubbing the hair off. It may appear on the neck, flanks, or sides, and extend from these points. The horse's coat may be extensively destroyed by this disease.

The dry form of the disease appears in pimples, which dry up, leaving a bran-like scurf. The itching in this form is also very great.

Treatment.—The affected parts of the body should be washed every day with soap and water, very thoroughly. Then an ointment, made as follows, should be carefully applied to all the sore parts:

Take—Pyroligneous acid.....	6 ounces.
Charcoal, powdered.....	2 ounces.
Olive oil.....	1 pint.
Common salt.....	1 ounce.
Resin, powdered	2 ounces.

Mix, to form an ointment, to be used once a day.

Give light, easily digested feed; and give, internally, the following:

Take—Sulphur, powdered..... $\frac{1}{2}$ pound.
 Cream of tartar..... $\frac{1}{2}$ pound.
 Powdered sassafras.....1 pound.

Mix, and give two table-spoonfuls twice a day, in the feed.

Groom well, to keep the hide clean.

RAT'S TAIL.

An intense itching at the root of the tail, on the upper side, sometimes occurs, causing the horse to rub or scratch the part against the timbers of his stall, until a streak of the hair is worn off. This itching is caused by an eruption of the skin at that place.

Treatment.—Fasten the horse so he can not rub the tail; then apply the following:

Take—Venice turpentine.....2 ounces.
 Pyroligneous acid.....2 ounces.
 Linseed oil.....2 ounces.

Mix, to form an ointment or liniment.

Wash the part once a day with soap and water, and anoint it with the above. Horses with small worms in the rectum will also rub the tail and rump. When caused by worms, treat the horse for them.

POULTRY LOUSINESS.

Great numbers of lice are sometimes found in the hair of the horse, mostly along the mane and on the breast. They are a small species of lice, of a dark gray color, being rather long and slim. They are identically the same species of lice found on fowls. They are communicated to the horse by fowls being allowed to roost and remain about the stable in which he is kept. They may be suspected, if the horse rubs the mane,

bites and scratches himself, and keeps this up, worse and more of it, from day to day, often tearing hair and skin both off. A careful examination will show the vermin themselves, if present.

Treatment.—The quickest way is to use something that will destroy the lice and also the nits.

Take—Corrosive sublimate.....	2 drams.
Red precipitate.....	$\frac{1}{2}$ ounce.
Alcohol	4 ounces.
Lard.....	$1\frac{1}{2}$ pounds.

Mix thoroughly, to make an ointment.

Rub the place where the lice are suspected. Whatever is used, the body should not be encircled with it. If any place should be missed the first rubbing, and lice should be found on it, rub that part again. Tobacco ooze will kill them, but it is dangerous. Cologne-water will kill common head-lice, why not these? The common coal-oil, now so extensively used, is one of the best agents for destroying lice that can be used. Try it. Anoint the lousy horse well with it.

SURFEIT.

This is a disease of the skin, which makes its appearance in small lumps, or pimples, on the horse's neck, and which sometimes spreads over his back, sides, loins, and quarters.

Symptoms.—The horse may be in the very best health and condition when surfeit makes its appearance. There are no symptoms going before by which the attack can be known to be coming on. The eruptions will generally be seen first on the neck, and they may not come out any further back, but they frequently extend along the sides, back, loins, or quarters. These lumps, or pimples, are about the width of the end of the finger, or less. They are most elevated in the center, and get thin, gradually, toward the edges. After remaining a few days, they discharge a thin, reddish yellow water, and scaly scabs

form in the hair, dry up and come off, taking the hair with them. Sometimes these lumps are attended with much itching. They may come out very suddenly, and occasionally go away quite as quick as they came; in such cases, the horse is very liable to be attacked soon again.

Causes.—It seems to me that the cause of this disease is a derangement of the stomach or digestive organs, and then the horse becoming suddenly chilled. Musty or mow-burnt hay is said to cause it; also, some poisonous herbs. The drinking of cold water, when the horse is hot, is thought by some to cause surfeit. A neglected surfeit may degenerate or run into mange.

Surfeit may be mistaken for mange or button-farcy. It may be known from mange by trying the short hairs at the roots of the mane. If the case be mange, they will be loose and come out; if surfeit, in their natural condition. In mange, the skin is thick, very scurfy, and puckered; in surfeit, the skin is in nearly its natural condition, except in old and neglected cases.

Surfeit will be known from button-farcy by the shape of the farcy-buds, which are somewhat flat on top, and have thick edges, and feel like a button in the skin. Farcy-buds generally appear first on the inside of the thighs and fore-legs, while surfeit-pimples are seldom found in these places.

Treatment.—In the first start, bleed from three to five quarts; then the following alterative prescription should be given:

Take—Powdered niter.....	3 drams.
Powdered sulphur	4 drams.
Powdered poplar bark.....	1 ounce.
Powdered black sulphate of antimony....	2 drams.

Mix. The above is to be given every night, in a bran mash, with a pint of flax-seed tea.

The horse should be warmly clothed and have gentle exercise. His diet should be light—green food, if to be had; if not, bran and shorts. If it does not improve on this treat-

ment, but still becomes worse, it will run into mange, and must be treated as such.

MALANDERS AND SALANDERS.

Horses are subject to a scurfy eruption on the inside of the legs—in front of the hough in the hind-legs, and behind the knee in the fore-legs—which becomes scabby and cracks. But little inconvenience results from it. When it occurs in the hind-legs, the disease is termed *salanders*; when in the fore-legs, *malanders*. These ailments, or, rather, this ailment, occurs very seldom in this country. My own observation in Europe has led me to the conclusion that the lime-dust of graded roads, thrown on the parts where the skin is so much in action, acts as a caustic, causing this affection. It occurs, generally, in coach-horses of every-day work.

Treatment.—Wash clean with soap and warm water, once a day, and apply the ointment recommended for *grease*, or *scratches*, which see.

SCRATCHES, OR GREASE.

This is an affection very common in most countries. It starts in the cavity above the heel, between it and the fetlock. It is characterized, when fully developed, by hard scabs; sometimes in clusters, but often covering the leg from the heel to the knee or hough; or by deep cracks in the skin. The disease may properly be divided into two stages; the first being what is generally termed scratches, and the second being known under the name of grease, or grease-heel.

Symptoms.—The usual symptoms of inflammation will be observed about the heels in the first of the attack of scratches, as heat, pain, swelling, and redness of the skin. But with those who do not pay careful attention to their horses, and our farmers generally belong to this class, this inflammation of the

skin will go through its first stage without being noticed. But when the peculiar, hot, tumid, and tender condition of the parts usually the seat of the attack is observed, scratches may be expected, and the proper treatment should be applied.

Very soon, however, these symptoms of active inflammation subside, to a certain extent, and another train of symptoms, constituting a chronic inflammation, supervene. This stage of the disease is what is generally known as scratches. The skin remains hot, and becomes dry and scurfy. The usual oily secretion, which is very great about the heels, and which is intended to keep the skin soft and pliable, becomes arrested under the influence of inflammation, and the skin becomes like a piece of scorched leather, and breaks and cracks by the ordinary motion of the parts. These cracks may become worse and worse, until the whole of the heel becomes covered with deep ulcerations, shooting up masses of fungus, or "proud flesh;" and as the hair-bulbs become involved in the inflammation, and the scabs or scurf fall off, the hair also comes off, leaving the skin of the leg much of the appearance of the hide of the toad. These fungus masses run an offensive fluid; they are tender, and bleed on the slightest touch, and after awhile become covered with a horny scale, called grapes; and they have aptly been compared, in this stage, to the coat of a pineapple. But, after the cracks have become deep, the discharge generally changes its character, and becomes a complete oil, having an offensive smell, and the horse rapidly runs down, or loses flesh. This oil or grease will burn much like lard. This I regard as the third stage of the disease.

But it must be remembered that every case will not go through all these different stages, nor, indeed, even the majority. For, as the disease is generally produced and continued by negligence in attending to the horse's feet or legs, it may be arrested, at any stage, by merely discontinuing such negligence, or by very simple treatment, as rest and cleanliness, or turning the horse on grass, but generally needs care.

There are also other forms in which the disease presents itself. In Europe, the disease appears, generally, by a large swelling of the leg, called *stocking*, and from this runs into grease. In other cases, neither scratches nor swelled leg precede, but the case assumes the form of grease from the first. This is called *star-foot*. I have seen colts of a *star-foot* mare, with the hair standing erect about the feet at four months of age, commence to run grease at two or three years old, or as soon as taken into the stable. This affection is evidently hereditary in these cases.

Causes.—Percival says: “The presence of grease is a pretty infallible test of negligent grooming.” Nature has adapted the different parts of every animal most perfectly to the uses for which they are intended. The heel of the race-horse is covered with a thin skin and fine, short hair, evidently for the purpose of quick action; that of the dray or farm-horse is covered with long, thick hair, and the skin is very thick.

There is a large quantity of oily matter poured out on the heel of the horse, for the purpose of keeping the skin soft and pliable, to enable the horse to perform his motions with ease. This oil also prevents, to a considerable extent, the mud and snow from sticking to the heels. Whatever removes this oil will render the skin dry, and disposed to crack and inflame, and, consequently, give rise to scratches.

Any thing that will produce inflammation of the skin of the heel, or in any way weaken it, will cause the disease. Working a horse on muddy roads, and allowing the mud to remain on his legs over night, or washing the legs after the day’s labor, and not properly and thoroughly drying them; cutting the long hair off of the fetlock; allowing the horse to stand where a current of air will strike the heels, from an open door or cracks in the stable behind his stall; suffering the feet to remain filled with dirt, etc.; allowing the dung and urine to accumulate in the stable or stall; allowing the water from the manure to accumulate in ponds about the stable-door, or in the

lot, where the horse has to walk through it. In short, any thing that will irritate or chill the legs of the horse may produce scratches.

There can be no doubt that, if horses were properly worked and properly taken care of, scratches would be unknown. It has been entirely banished from cavalry horses in Europe.

Genuine grease, I think, may be regarded as infectious, at least, when a well horse is put in the same stall where one running grease has been kept. It is certainly difficult to cure a horse while standing in the same stall he occupied before treatment was commenced.

Treatment.—At the risk of repetition, I must again call attention to the importance of proper management of the horse, as a means of preventing this very distressing affection. Good stables and clean lots are indispensable to the health of the horse. And neglect of grooming is almost criminal, when the horse has faithfully performed his day of weary toil, through snow, mud, and rain. I do not make these remarks merely to fill up space; I wish them considered well, and hope that they may be the means of arousing many to the realization of their cruel neglect of man's best servant. Let those who use the horse only consider how much of their own comfort depends on his service, and I think their consciences will restrain them in many an act of cruel neglect of him.

The medical treatment of scratches is designed to reduce the inflammation, and cause the sores to heal. There are few diseases for which there are more cures among horsemen than for this, and yet it is a disease that we often find to have continued for a great length of time, and to have done great mischief, notwithstanding treatment had been applied constantly. Such obstinacy in the disease, in most cases, is caused by the horse still being left exposed to the cause which produced the disease.

The following treatment I have found the most satisfactory and the least troublesome of any other:

Take—Powdered gum-camphor..... $\frac{1}{2}$ ounce.
 Powdered gum-myrrh.....1 ounce.
 Sulphuric acid.....1 ounce.
 Spirits of turpentine.....1 ounce.
 Lard.....1 pint.

Mix thoroughly, to form an ointment. To be rubbed on the affected limbs once a day.

The legs should be washed with hard soapsuds every day, and rubbed dry with cloths, before the medicine is put on.

Where the leg is much swollen and inflamed, and especially if there are sproutings up of proud flesh, a splendid treatment is to make a poultice of ground flax-seed with lime-water, and, before applying it, sprinkle it over with powdered burnt alum. Renew the poultice twice a day. This is to be used until the sores look healthy, and then use the above ointment. To make lime-water, see the article "Lime."

CRACKED HEELS.

This is an affection of much the same nature as grease, or scratches. The crack may be trifling, at first, in appearance. The skin around it becomes red, swollen, and tender, and the swelling may extend a considerable way up the leg. An offensive discharge takes place from the crack, and there is much lameness at times. The general health of the horse may be much injured.

Treatment.—The same as for scratches, which see. But linseed poultices may first be used with good effect, and then the ointment used in scratches. Rest is an important help to the cure.

HIDE-BOUND.

This is not a disease in itself, but is rather a symptom, or result, of some other disease, from which the horse is suffering. The skin is tight on the body, and the coat *staring*. In most cases, the disease which has caused the hide-bound can

be ascertained by a careful examination of the horse; and, of course, the proper treatment to cure that disease, whatever it may be, will cure the hide-bound. Among the diseases which are most likely to give rise to this trouble may be mentioned derangement of the digestive organs, of the urinary organs, and constitutional diseases, such as glanders, farcy, etc. It is proper to remark, however, that hide-bound is, in many cases of disease, one of the first symptoms to be observed; and this is, undoubtedly, one reason why it is so generally regarded as a disease itself. Starvation causes hide-bound, and in this case it comes nearer being an independent disease than in any other. But starvation, or insufficient food, affects the general system as powerfully as any other disease. The fact that hide-bound is not a disease can not be too strongly impressed on the mind. Hundreds of horses have died while this symptom has been treated, while the disease itself has been entirely overlooked.

But as this condition of the horse's skin is one of much importance to be observed, I will explain the principal symptoms by which it is known: By feeling the hide, it will be found that the trouble is confined to the skin, and does not affect any thing deeper. The horse may be in fair condition, and even the cellular tissue beneath the skin may be in its naturally soft and spongy condition; but the skin is dry, hard, and unyielding; and, as to tightness, is like the skin of the head or limbs; it has lost its oily, elastic character, and becomes as a piece of dry leather drawn over the frame of the animal; it is very hard to pinch or gather up with the hand; the coat, or hair, becomes dry, harsh, and staring, and no effort of grooming can give it its natural, soft, glossy appearance; the hair will continue dry, and the coat will continue to "stare." The skin and hair are evidently destitute of that oil which nature has provided for keeping them in their naturally soft and elastic condition.

Causes.—The immediate cause of hide-bound is a drying up

and unhealthy condition of the secretions of the skin, and particularly of those little glands which secrete the oil, by which the hair and skin are kept in their naturally soft and elastic condition.

But the first and important cause, as before stated, is some disease by which the system has become deranged, and hide-bound has taken place as a consequent or symptomatic disease. Derangement of the stomach and digestive organs is the most frequent cause. But constitutional diseases, generally, will produce it—as farcy, glanders, founder, and consumption, and, particularly, insufficient food, or starvation.

Treatment.—This will depend on the cause that produced the hide-bound. A careful examination of the horse must be made to ascertain the disease under which he is laboring, and if that can be discovered, the proper treatment for it will cure the hide-bound. But a great deal of good may be done, in any disease which interferes so greatly with the action of the skin, by proper friction, cleaning, and rubbing, and warmth of clothing; and these measures should be made use of whether the disease causing the hide-bound can be ascertained or not. But they must not be relied on to effect the cure.

In cases where the disease causing the hide-bound is obscure, or can not be ascertained, the following treatment should be pursued until the disease can be ascertained, or until the coat and skin become healthy: Rub the horse well, morning and evening, so as to keep the coat clean, and aid in producing warmth of the skin. Blanket warmly. Use for this purpose two blankets, joined along the back with tapes, so as to leave a space of two inches between them. This is done to permit the insensible perspiration to more readily pass off. For internal treatment:

Take—Flax-seed.....2 quarts.

Boiling water.....2 gallons.

Mix the flax-seed in the water, and boil slowly until, when cold, the mass

will form a jelly. In one tea-cupful of this flax-seed jelly mix one tea-spoonful of ground ginger, for a dose.

This dose is to be given three times a day, mixed in his feed, which should be bran, or bran and shorts, or cut hay with bran. At the same time give

Black sulphuret of antimony.....3 drams.

This is one dose, and is to be given once a day, in the feed.

Also:

Niter, or nitrate of potassa (commonly called saltpeter)....3 drams.

This is also one dose, and is to be given once a day, in the feed.

Either the antimony or the niter may be given in the morning, and the other in the evening, mixed with the jelly, to save trouble. Or the following, which has been long in use, may be used in connection with the flax-seed jelly and ginger:

Take—Black antimony.....2 drams.

Niter 3 drams.

Sulphur.....4 drams.

Mix, for one dose. To be given once a day, in a bran mash.

When the skin begins to become soft, and the coat to regain its smoothness, the other remedies may be dropped and the flax-seed jelly and ginger continued, until the horse regains his health and condition. Gentian and poplar bark are serviceable in some cases. A poplar pole placed in the horse's stall will answer the purpose. He will eat as much of the bark as is necessary for him.

But the true course is to ascertain the disease which gave rise to this condition, and make use of the proper remedies to cure it, and that will remove the hide-bound.

STINGING OF INSECTS.

By accident, a horse is sometimes stung by great numbers of bees, yellow-jackets, or hornets. The sting of these in-

sects is quite poisonous, and affects some animals much more than others.

The symptoms attending a severe case of stinging are: Intense pain and irritation of the skin; a very high degree of inflammation rapidly takes place in the skin, the heat, pain, swelling, and redness being very great; the animal becomes perfectly furious, rolls, plunges, and rubs himself against every thing in his way. If the stinging has been bad about the face, his eyes may become perfectly closed by the swelling, and his breathing, from swelling of the nose, greatly obstructed. Death may take place very soon, or the horse may live several days, and yet die from the extensive inflammation.

Treatment.—The object is to neutralize the effects of the poison. For this purpose the whole surface of the body should be promptly bathed with one or the other of the following articles. Use those at hand until others can be got. Soda, or saleratus, and water; lime-water, or water with wood-ashes in it, to make a weak lye, or *salt and water*. Any of these may be used, or they may be used, one for awhile and then another. Keep the body well bathed, but never rub it. The following should be got as soon as possible, and used:

Take—Linseed oil.....1 pint.

Lime-water 2 pints.

Mix, to form a liniment. To be used frequently.

GRUBS BENEATH THE SKIN.

In some parts of the world, a grub, somewhat resembling that which is found under the skin of the ox, is found to inhabit the skin of the horse. This grub is the product of some species of gad-fly. The egg or nit deposited by the fly develops into this grub, which, when it has matured, leaves its chamber in the skin, and falls on the ground, to undergo transformation into the parent fly. These grubs are not so

large as those found under the skin of the ox. The latter is called "*hypoderma bovis*" (skin inhabitant of the ox). The name "*hypoderma equi*" (skin inhabitant of the horse) has been proposed for the former. It does not exceed an inch in length when mature, while that of the ox is from one and a half to two inches. This larva is found principally on horses that have been at pasture in July and August. Its presence causes large, indurated knots, of a conical shape, to appear along the back. If the hair be separated, a small opening or aperture can be found, and a thin matter squeezed out. In the last months of its growth the grub itself may be squeezed out. It takes it ten or eleven months to mature in the skin. Its presence occasions no other disease than the local tumor described. Some troublesome itching may occur in the last stage of the growth of the tumor.

They are common in the northern part of France, Belgium, and Holland, and along the entire shore of the Baltic and North Sea. The same treatment used for the similar grub in the ox is best for this.

MISCELLANEOUS DISEASES.

SWELLING OF THE LEGS—STOCKING.

THE legs of the horse are very liable to be attacked by swelling. It occurs much oftener in the hind-legs than in the fore ones. The extent and degree of swelling varies greatly, as also its duration. It also occurs in extremely different conditions of the horse's system. The difficulty which I am now treating of is an acute inflammation of the cellular tissue of the legs. There are other kinds of swellings attacking

the legs, but they will be understood by the descriptions given of the diseases giving rise to them.

Symptoms.—This disease is very sudden in its appearance: the horse may be in apparently the best health, and in the course of a few hours, or one night, swell enormously, from the pastern or hoof to the hough, or even to the stifle. But it is generally more gradual in its approach or first attacks. This swelling is attended by considerable heat and pain in the part, and a stiffness of the limb, rather than lameness. Generally, the swelling goes down when the horse is exercised, and returns again on long standing still. If the disease is suffered to continue, the horse loses condition, and it may run into grease or scratches.

Causes.—Soft-footed horses, by standing too much on their feet, are apt to stock.

Treatment.—If the horse will lie down, when at rest, no other treatment is necessary. If the inflammation is quite high, and the horse will not lie down, he should be made to stand in cold water every evening for about half an hour, and the feet should be stopped at night with wet, tough clay, to keep them cool; or the legs may be frequently washed with a solution of tincture of arnica.

ANASARCA—DROPSY.

The horse is liable to a dropsical swelling of the legs, which may extend up to the body and along the belly, and considerable distance up on the chest. It is known by the character of the swelling, showing that it is caused by the presence of watery fluid in the soft or cellular parts of the flesh. If the part swollen be pressed on by the thumb for some time, a pit or depression will remain for several seconds before it will again become level.

There are several causes which may give rise to this difficulty. It may occur in the progress of other diseases, as farcy,

glanders, and some eruptive diseases; a very poor condition of the blood, as follows a heavy loss of it, may cause dropsical swelling; or feebleness, from whatever cause. A form of this disease occurs sometimes in mares that are with foal, generally attributed to pressure on the veins. I do not think this is the cause of the difficulty. I have seen many such cases. They have occurred so frequently some years, in this part of the country, as to almost warrant the conclusion that it may prevail as an epidemic. I regard the cause as constitutional—existing in the blood; but what the change of that fluid is, and how connected with the peculiar condition of the mare, I am not able to say. It has generally proved fatal to mares here.

Treatment.—The treatment of this disease must always have reference to the cause that produced it. If it occurs during the progress of other diseases, the proper treatment for the other disease will remove the anasarca. If it is caused by the loss of blood, moderate exercise, good, healthy food, and proper stabling and grooming are probably all that is necessary. Some of the preparations named in “Indigestion” may be given with benefit. Where it is the result of debility, such measures as will best restore the declining strength of the horse will be necessary. Medicines to act mildly on the kidneys will do much good.

LYMPHATITIS.

This is an inflammation of the lymphatic vessels and glands of the limb or limbs affected. For a description of these, see the article headed “Lymphatics.” It is sometimes known by the name of *weed*, *feltick*, *thick-leg*, *water-farcy*, *shot*, *grease*, *ilk-leg*, etc.

The following description is from Surgeon Haycock:

“The disease, for the most part, commences with a shivering fit, though, in many cases, its existence may be so slight and

its duration so short as not to be observed by any except a careful observer. Generally, the attack is sudden; the owner, or servant in care, may go now, as it were, out of the stable, and leave his horse, to all appearance, perfectly well, and upon returning, in an hour hence, he will find him standing upon three legs, while the fourth will be flexed, (raised), and held high from the ground. The pulse will vary in its beats according to the intensity of the attack, rarely, however, beating less than fifty or more than one hundred per minute, while the respiration may be fifteen or twenty, or even forty, in the same interval of time. If the affected limb be examined, it will be found hot and swollen, and tender if pressed upon, which symptoms, for many hours, will gradually increase in intensity. Soon after commencement, a number of vessels may be seen running across the limb, in various directions, of about the thickness of a quill; they are the most numerous, however, upon the inner surface of the leg, where they appear to terminate in round or irregularly formed masses, which masses are acutely tender if squeezed with the hand. These prominent vessels are the inflamed lymphatics, and the prominent masses referred to are the inflamed lymphatic glands. Sometimes the swelling extends from the junction of the limb with the body down to the very foot; at other times it only reaches down to the hough; and, when very severe, a sort of dew exudes from the skin and lies upon the hair.

“The coarser the breed and the older the animal, the greater the liability to lymphatitis. Young, coarse-bred horses are also very prone to it, particularly if highly fed and under-worked; but in the young horse, the disease, in the majority of cases, if not in all, quickly runs its course, and the afflicted limb becomes in time perfectly restored; and, if due precaution be taken, the malady may not again manifest itself, at least for years to come; while, in the old horse, the diseased limb is seldom or never reduced; it remains permanently thickened, and the animal is extremely liable to have acute or sub-

acute attacks of the same disease periodically. In the majority of cases, again, its action is usually confined to a hind-leg, and that on the left side. Sometimes both limbs are affected, but never, that I have seen, very acutely at the same time; and the left limb might be attacked, and some time afterward the right one, but never both limbs simultaneously."

He regards as predisposing causes coarse and peculiar food, too nutritious and too great quantities of such food, previous attacks, old age, and changing from a poor to a rich diet. The immediate or exciting causes are, heavy blows on the limb, severe scratches and cuts, sudden overexertion, working the horse in water or wet ground, the sudden checking of accustomed discharges, as grease, thrush, etc., and the sudden checking of perspiration.

Treatment.—If the case is very bad, it will be well to bleed six or eight quarts at the commencement. But this is not generally required. Then give the following:

Take—Sulphur	2 ounces.
Saltpeter.....	2 ounces.
Black antimony.....	2 ounces.

Mix, and give one table-spoonful of the powder three times a day, in a drench.

It would do well to begin the treatment with a cooling physic. A solution of tincture of arnica may be often applied to the affected part. The limb should be wrapped and the bandage kept wet with the solution.

BIG-HEAD.

This remarkable disease is characterized by a hard swelling on the horse's face, on a direct line from the eye to the nostril. This disease seems not to be known in Europe, nor in the Eastern States to any considerable extent. It has committed great havoc, at different times, in some parts of the

West. What I shall be able to present with regard to it or the result of my own observation and experience on the disease since in the West, and what I have gathered from my interviews with a veterinary surgeon of skill, who has practiced many years in the West, and the light thrown on the subject by Mason, in his small work.

Symptoms.—The first symptoms that will be observed are debility, loss of appetite, and indisposition to move about. In this stage of the case, the true character of the disease may not be suspected. A slight weeping, either of one or both eyes, according as the disease is going to manifest itself on one or both sides of the face, will be observed early in the attack. Pretty soon a swelling, small at first, but gradually increasing in size, and quite hard, will be observed on the face, on a line from the eye to the nostril, and about half way between them. If this tumor be pressed hard, it causes the horse to wince, showing that it is tender and painful, but if rubbed gently with the hand it appears to give ease. The lower jaw-bone will next be observed to be becoming enlarged, or apparently thickened near the union of the two sides, that is, under the chin. The appetite continues poor, a great degree of stiffness is present, and the horse loses flesh quite rapidly. If the disease continues, the head becomes enormously swollen; the joints swell, or become puffed, as if blown with wind, but, in a short time, this puffiness is replaced by matter, or pus, which breaks through the skin, and discharges as it gathers. The horse becomes unable to stand, and falls, to rise no more without help. There is but little or no fever, at least of an active character, during the progress of the disease.

Causes.—As to this, nothing is really known. It is supposed to be infectious, in the last stage of the disease, after abscesses about the joints have formed and broken. It is the bone of the nose which first becomes affected, or, at least, its periosteum.

Treatment.—The treatment which I place the most confidence in, is the following:

Take—Sulphur 4 ounces.
 Saltpeter.....4 ounces.
 White hellebore.....1 ounce.

Mix, and give one tea-spoonful of the powder three times a day, in his feed, which should be ground or cut feed, such as he will eat.

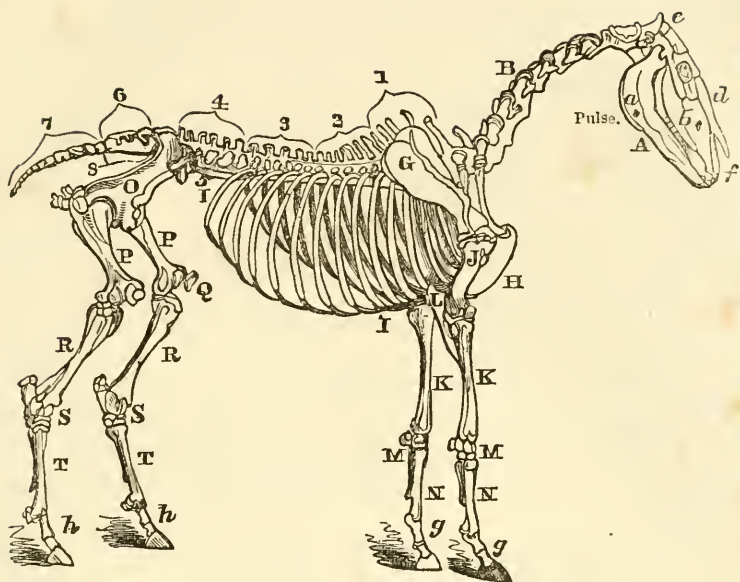
Use the following local application to the swelling:

Take—Tincture of cantharides 2 ounces.
 Corrosive sublimate.....1 dram.
 Aqua ammonia.....2 ounces.
 Oil of hemlock.....1 ounce.

Mix, and rub on the swelling twice a day, until it blisters.

After the blister has dried up, grease it thoroughly with lard, to take the scab off; then blister again with the liniment as before, until the swelling is reduced. The internal medicine must be continued until the horse is perfectly well. The above treatment is effectual, and will leave no mark nor blemish.

The following is a less troublesome course, in some particulars, and has been pursued with success. Make an incision in the skin, over the tumor, of sufficient size, and insert in it a lump of white arsenic the size of a field-pea, or an equal quantity of the powder wrapped in paper, and close the skin over it by a stitch. Very great inflammation and considerable destruction of the parts will follow. In a month or six weeks, the part affected by the medicine will become circumscribed, and, in about the same length of time again, will have sloughed out, leaving a ghastly sore, but very healthy in its character, notwithstanding much of the spongy bone may have been taken out. It is then only necessary to heal the wound. This can be done by the applications usually recommended for such purposes. Any simple ointment will answer the purpose. During the treatment, the horse should be turned on grass, or kept in a clean, cool stable, and lightly fed.



SKELETON OF THE HORSE.

A, The lower part of the jaw-bone. Here the submaxillary gland and the pulse are located.

a, The upper part of the jaw-bone.

B, The cervical vertebræ, or bones of the neck, seven in number.

d, The skull and face.

e, The parietal bone, or upper bone of the head.

f, The point of the nasal or nose-bones.

1, The five dorsal vertebræ, or bones of the withers.

2, The next eight or forward spines of the vertebræ. They stand upright.

3, The last five of the bones of the back, which incline forward.

4, The six last bones of the lumbar or back; in all, twenty-three.

5, The five transverse or cross projections, forming the width of the loins.

6, The five sacrum or haunch (some call them rump) bones, leaving a space for the hinge of both hind limbs.

7, The fifteen coxygeal or tail-bones.

b, The attachment of the masseter or great muscle of the jaw is inserted.

G, The scapula or shoulder-blade.

H, The sternum or breast-bone.

J, The humerus or arm-bone.

K K, The radius, or bone of the forearm above the knee.

L, The ulna or point of the elbow.

M M, Carpus or knee-joint, consisting of two rows of bones.

N N, Cannon, the shank or shin-bones; also, the splint-bones behind.

g g, The upper and lower pastern-bones which rest on the coffin-bones below, one showing the hoof on.

h h, The hind pasterns, no hoof on, but one showing the lamellæ.

T T, The hind cannon or shank, showing the splint-bones behind.

S S, The hough joint, showing the astragalus or hough-bone, the os calcis or tip of the hough, and the two rows of joint-bones.

R R, The tibia or leg-bone between the hough and the femoral or thigh-bone, called femurs.

Q, The stifles, corresponding to the knee-cap of a man. They are out of place, to show their shape.

P P, The femoral femurs or upper thigh-bones.

O, The pelvis, or bones forming the haunch, receiving the upper end of the femur into its socket, and hinging with the back or spinal vertebræ between figures 4 and 6.

S, Under and back of this letter is the ischium, being the part into which the thigh-bone works.

I I, The ribs fast by a hinge to the back or vertebral column, and joined by a cartilage, at their lower ends, and the cartilage ends in the sternum or breast-bone.

SURGICAL DISEASES AND INJURIES.

In this part of the work I shall treat of those ailments which require operative interference in their treatment. They embrace those diseases which result in the change of the solid parts of the system, and require, principally, other means than the internal administration of medicines for their cure; also, wounds, bruises, tumors, broken bones, dislocation of joints, and sprains. This embraces a most extensive part of veterinary practice, and in which the skill of the horse doctor is subjected to a severe test. He may make blunders in giving medicine, and none can know it, but he can not get off so easily where all can see what he is doing. It requires a clear head and steady hand to be able to succeed well in this branch of the veterinary art. There are many things to be taken into consideration in every case presented. The first is, to ascertain the exact nature and extent of the injury;

second, whether, under the circumstances, it can be benefited by treatment; third, whether it will justify the expense to be incurred; fourth, the exact means to be made use of in the case. All these points should be clearly determined before proceeding with the case.

It is an object to avoid blemishing the horse as much as possible. Some surgeons forget this, and use measures which leave permanent blemishes, when a little more time or expense would accomplish the object without any blemish.

AFFECTIONS OF THE FEET.

CONTRACTION, OR HOOF-BOUND.

CONTRACTION is a wiring in, or drawing in, of the heels of the crust or wall of the hoof; the hoof becoming more erect, the lower border smaller in circumference, and the frog diminished in breadth.

Symptoms.—The above description will generally enable the observer to tell when contraction is present. It may occur in either or both of the fore-feet. When hoof-bound comes on fast, it is always accompanied with lameness. There is generally some lameness at the commencement, even when it comes on slow; in other cases, however, it is absent, and generally absent when the case is of long standing. When the lameness is severe, the horse exhibits uneasiness in standing, places the lame foot forward, in atrophy of the muscles. Sweeny does so, but puts the heel on the ground, and, in contraction, the toe; or, as it is said, points with it; or, if both feet are affected, he first points with one, and then with the other, with the heel raised. He experiences much difficulty in moving; raises the foot but little off the ground

as he walks or trots. His step is short, quick, and light. The least irregularity of the ground bothers him very much, causing him to trip, or even stumble, especially in going down hill. On examination of the foot, it may show a general state of contraction, but generally only across the quarters, or at the heels; and when the contraction is of the heels, the upper borders at the coronet, the middle or the lower border may be the point of greatest contraction. Only one heel, and generally the inner one, may be wired in, or both, but the inner one the most. As before stated, one or both fore-feet may be affected. The sole will be unnaturally concave or hollowed, and, in recent cases, heat and tenderness may be observed about the hoof.

Causes.—Few difficulties to which the horse is subject have more causes than contraction; and as these are generally such as proper management will prevent, I shall explain them at considerable length. It is certainly better for a farmer to spend an hour in learning the causes of hoof-bound, and how to avoid them, than to have one case occur among his horses which he could have prevented.

A low grade of inflammation or irritation in the foot, not amounting to acute founder, is a very common cause of contraction. This irritation may be produced by various causes, but by none more frequently than inaction and high feeding, which bring on a feverish state of the blood, and the feet being the furthest removed from the heart, the blood has a natural tendency to flow to them. This producing of founder or irritation of the foot by overfeeding has some analogy or resemblance to gout in the human.

Want of proper moisture is another very common cause. Farmers' horses, that are worked every day, are not very subject to it, nor young horses on pasture. But horses that are stabled, should always have their feet "filled," as it is called. A piece of thick felt, or old hat, cut to fit the foot, and soaked in water, is the best filling.

Thrush (which see) may cause contraction, but it is much more frequently a consequence of it.

The cutting away of the bars, which some smiths seem to have such an itch for, is a fruitful source of contraction. Nature intended these as braces or stays to the foot.

A neglect of proper paring of the hoof burdens it with a large amount of dry, contracting horn, which prevents its free motions and disposes to contraction. In the state of nature the horse wears off these useless parts, but when domesticated, (tamed), he is often deprived of the necessary action, and hence we must resort to artificial means of effecting the object. In paring the hoof we should imitate nature. Remove such parts only as naturally have a tendency to come off.

Improper shoeing is among the common causes of hoof-bound. But this subject demands so much attention, that I must refer the reader to the article on "Shoeing" in this work, stating, however, that the proper preparation of the foot for the shoe is a very important matter. Every owner should know how his horse ought to be shod.

Treatment.—No ailment to which the horse is liable requires more careful reference to the cause that gave rise to it than contraction. If it is the result of any other disease of the foot, treat that disease; if of bad management in any way, correct the evil; if of bad shoeing, have the shoes removed and better ones put on. But something may be done, in most cases, to relieve the trouble, and the mischief likely to follow long contraction renders it necessary to attend to the case early.

The following course of treatment will cure hoof-bound in a comparatively short time:

The hoof should be neatly and well pared down; all dead horn removed from the sole, and the wall thinned by rasping. A shoe, long and wide at the heels, with out calkins or corks should be put on, and then spread out at the heels by placing the jaws of the smith's tongs between the heels of the shoe

and spreading the handles apart. The entire hoof should be well soaked with the following liniment, twice a day:

Take—Linseed oil.....	4 ounces.
Saltpeter	4 ounces.
Oil of spike	2 ounces.
Aqua ammonia.....	2 ounces.

Mix, and shake well before using.

The shoe should be removed every three weeks. The horse should stand on soft ground.

SAND-CRACK, OR SPLIT-HOOF.

Sand-crack is a crack in the wall of the hoof, running in the direction of its grain, or up and down, occurring either at the quarters or at the toe. The former is sometimes called *quarter-crack*; the latter, *toe-crack*—quarter-crack most frequently occurring in the fore-feet, and at the inner quarter; toe crack in the hind feet. The crack may commence at the lower border of the wall or tread, and extend but a little way up it; or it may neither reach the coronet nor the lower border; or it may extend the full length of the hoof, from the coronet to the lower border or tread. It also may vary in depth; sometimes seen only part of the way through the wall, and, in other cases, entirely through, completely separating the wall from the coronet to the tread.

Symptoms.—The simple description above given will enable any person to tell a case of split-hoof, and whether it is toe-crack or quarter-crack, and also the length of the crack; but, to determine the depth, a more careful examination is necessary. Each side of the crack should be pared away until the depth is ascertained, for the treatment to be adopted depends mainly on the depth of the crack.

If the crack goes through the wall there may be considerable lameness, and bloody matter may ooze out through the split. Fungus or proud-flesh may also shoot up from the sensitive parts below in the hoof.

Gravel and sand should be carefully looked for and removed while making the examination.

Sand-crack, when neglected, may give rise to quittor.

Causes.—There can scarcely be any doubt that a brittleness of the hoof, either naturally existing, or the result of disease or bad management, is the main cause of the hoof splitting. But the immediate cause is a severe strain or jar on the hoof. The cause of its occurrence in the inner quarter of the fore-foot most frequently is, that it is more directly exposed to the weight, and is also thinner than the outer.

The toe of the hind-foot is put on great strain when the horse is pulling a heavy load, or moving rapidly, for the hind-feet are chiefly concerned in propelling or forcing the horse forward, and the principal strain is thrown on the toe.

Bad shoeing is a cause of split-hoof that must not be lost sight of. If the heels of the shoe are brought in close together, it will throw great strain on the quarters, and particularly if high corks are turned on them. A weak place or flaw in the shoe, or if it fits unevenly, may cause a crack or split in the hoof. A broken shoe is very dangerous. Breaking the coronary ring causes a crack that will not join for life.

Treatment.—Pare out each side of the crack nearly to the quick. If proud flesh is sprouting up, apply powdered burnt alum to it until it is removed. Then apply balsam of fir along the crack. Then it is ready to be drawn together, so that the new horn, as it is formed, will be solid. For this purpose drill a hole through the hoof, across the crack, starting the hole far enough from the crack not to let the drill touch the sensitive parts of the foot. The drill should come out about the same distance from the opposite side of the crack. If the crack is in the toe, three holes should be drilled across it. The first should be about an inch from the hair, the second half way between it and the lower one, which should be an inch from the lower end of the crack. A strong piece of wire is to be driven through each of these holes, and then a piece of tough wire is

to be passed, first over one end of the rivet, and then over the other, several turns being made, and then the ends twisted together. By this means the crack is brought firmly together. The bar shoe should then be put on, which should be scalloped out under the crack so that that part of the hoof will not rest on it. A coat of pitch should then be put over the hoof, to still further protect the parts, and strengthen the wall of the foot. Two rivets are enough for quarter-crack, and the nails on each side of the crack should stand away from it, so that, when clinched, they will have a tendency to draw the crack together.

FALSE QUARTER.

When the coronary substance, or ligament, is bruised or divided, the horn will be divided as it grows down, presenting a split in the hoof like sand-crack, or one edge may overlap the other. This is known by the name of false quarter, a name which I should like to see changed for a better one. Another form of this malady is, when the part of the coronary substance injured secretes horn of a weaker character and different color, forming a streak down the hoof. In this case, the weaker part will be more liable to sand-crack.

Symptoms.—An examination of this case is mainly for the purpose of ascertaining the extent of injury to the coronary substance, for this must be restored to a healthy condition before the crack in the crust will unite; or, rather, before the wall will be formed entire or perfect.

The opening in the crust, as well as the cut, or injured part at the coronet, must be carefully examined, and any sand, gravel, or any other foreign substance that may have got in, removed.

Lameness, of a more or less severe character, is a frequent accompaniment of false quarter.

Causes.—Any thing that will injure the coronary substance which secretes, or throws out, the horn of the wall, may cause

false quarter. Tread, neglected, often causes it, but much oftener the caustics, (burning medicines), used by some farriers and ignorant pretenders, in treating tread.

Treatment.—The object is to cause the divided coronary substance to unite, or to cause it to throw out healthy horn. The split in the quarter must be held together by the same means recommended in sand-crack, or split-hoof. The coronet, at the injured part, should be moderately touched with a heated round or flat iron. This will be more likely to cause it to form a perfect wall than any amount of blistering or burning with caustics. After the firing, a poultice of linseed meal may be applied for some days, to heal the burn kindly and keep the parts soft.

RING-BONE.

A deposit of bony matter, taking place either on or near the pastern-bone, has received the name of ring-bone. And, as very foolish notions prevail with regard to this malady, I shall be somewhat particular in explaining its origin. As has been more than once remarked, all the free surfaces (outsides) of the bones are covered by a thin, whitish, and exceedingly tough membrane, called the periosteum. The joints are also firmly bound together by firm bands or straps, called ligaments. Now, when the periosteum, or ligaments, about the pastern are exposed to the proper causes, a new process, called ossification, (the formation of bone), commences in them, and as this extends, the covering of the bone, the ligaments, and even the muscles about the part, are changed into a mass of spongy bone, which is firmly attached to the pastern-bone, as if a part of it.

This bony tumor may nearly, or quite, encircle the end of the pastern-bone, forming a ring, and hence its name; or it may extend only part of the way around, or appear only as a bony tumor at one side or the other, or on the coronet-bone, under

the coronary ring. It may extend much further than this, however, even to the fetlock-joint, and produce stiffness of it. Stiffness, called ankylosis, of the pastern and coffin-joints, are common results of ring-bone.

From the foregoing explanation, it will be seen how ridiculous many of the cures often recommended for this disease are. And, not only so, but how absurd some of the notions entertained of it are. For example, Dr. Dadd tells us of a writer in New England, who says: "Ring-bone is fed by a bladder, situated at the posterior parts of the tumor."

Symptoms.—It is generally no difficult matter to satisfy one's self of the existence of ring-bone. The eye or the hand will be quite sufficient to detect it, even though the deposit of bone should be very slight. But the extent to which the joints may be involved may require more care, and on this may depend considerable; for, though a horse may not be entirely worthless that has ring-bone, some would be a dear bargain at nothing, while it might justify to pay a small price for others.

There is always more or less impediment in the motions of the joints of the pastern and foot, but not always what might be termed positive lameness, though, in some cases, there is very great lameness; and necessarily so, when the tumor has become large and the joints stiffened, or when the disease has attacked a tendon, as it sometimes does. Also, in the earlier stages of the disease, when the parts are irritated or inflamed, before they have accommodated themselves to the new condition of things, lameness is to be expected. Heat and tenderness will also be found when the inflammation is considerable.

Causes.—These may be considered under the heads of predisposing causes, or such as render the horse liable to have ring-bone, and exciting causes, or such as immediately bring on the attack.

Of the predisposing causes, hereditary influence may be regarded first in importance. The colts of a ring-boned sire or dam will most certainly be more liable to it than those of sound

parents. Horses having a rheumatic constitution, such as are liable to founder, are predisposed to ring-bone; for it is no less true among horses than among men, that such constitutions are peculiarly liable to ossifications, or deposits of bone in and about other parts.

Form is another thing to be taken into account. An upright pastern is much more likely to be affected with ring-bone than an oblique one, for the weight is thrown more directly on the top of the bones, and jars or concussions are very liable to be the result. Upright pasterns lose the advantage of that elasticity or spring, which nature intended in making considerable obliquity, or slant, the type or pattern. As we have several times had occasion to remark the ingenious contrivances of nature to prevent concussion, so we may here say that in the long, oblique pastern, this object seems to be peculiarly accomplished; whereas, in the short, upright one, it is as signally defeated.

The exciting causes, or such as are usually said to produce ring-bone, are severe concussions or jars to the pastern-bones, which excite inflammation in the covering of the bone or the ligaments; running on hard ground, with improper weight; jumping, and lighting on hard substances; striking the pasterns against any thing; and traveling through thick, stiff mud, where the feet stick.

The hind pasterns are said to be more liable to ring-bone than the fore ones; the reason assigned for this is, that they are more liable to concussions than the fore ones, from the weight thrown on them in propelling. But it appears to me that their greater obliquity quite compensates for this disadvantage. If it is the case, I would rather attribute it to their greater liability to be struck against objects, on the philosophy of the Irishman, who had but one pair of shoes for his horse, and wanted them put on behind, for, "it was a dale of a poor horse that could not see where to set his fore-feet."

Treatment.—The same object is to be sought to be accom-

plished in the treatment of ring-bone that is in bone spavin—to stop the inflammation and the further growth of the bony tumor. For this purpose, the hair is to be closely clipped off around the pastern, over the tumor or enlargement, and the ointment, recommended in spavin, applied over the tumor in precisely the same way.

The following will greatly reduce the tumor, but it is very severe. It is better to use it than have the horse destroyed by ring-bone:

Take—Corrosive sublimate.....1 ounce.
Lard.....2 ounces.

Mix, to form an ointment.

Clip the hair off over the tumor, and apply the ointment. In twenty-four hours apply it again; then let it remain three days and pick out any loose parts. Apply to the sore that is left oxyd of iron, once a day, for a few days. Let the horse have moderate exercise.

BRUISE OF THE SOLE.

By rapid traveling over hard or gravelly roads, when the horse is barefooted, or if he has cast a shoe, the sole of the foot may become considerably bruised, giving rise to more or less severe inflammation within the foot, and lameness. Bruise of the sole may result in canker, thrush, and, more commonly, quittor. The treatment of bruise of the sole is to keep the horse quiet, and apply cold water to the foot, by keeping cloths wrapped around it, wet with cold water. If the case is likely to result in any of the above diseases, treat it accordingly.

CORNS.

Corn is a bruise of the sensitive sole, its seat being in the point or heel of the sole; that is, in the angle between the wall

and the bar; almost always found on the inside of the fore-foot.

Symptoms.—Nothing but a careful examination of the part which is the seat of the corn will determine its presence; and this is not likely to be made until something leads to suspecting its presence.

If the horse has corn only in one foot, he will be decidedly lame, and when standing, if it is very tender, he will often favor the heel by resting the foot on the toe, and the weight on the sound foot. If both feet are affected, he steps light, or gingerly, showing tenderness of the feet rather than positive lameness. If a trotter, he will have a disposition to try pacing; will flinch, or jerk his feet excitedly, if his heel comes down on a stone, and very often stumbles, and steps very lame for a few paces.

These symptoms will plainly indicate the presence of mischief, and the necessity of a careful examination for corns. The shoe must be removed, or taken off, the angle between the crust and bar pared down with a blacksmith's drawing-knife, until all the scaly horn is removed, and the sole itself made quite thin. If corn be present, a spot of a reddish or dark color will be observed in the sole, and no doubt of the case will then remain. It will then be the object to determine to what extent the disease has progressed. To do this, it will be necessary to still further pare out the corn to its very bottom, being careful not to wound the sensitive parts. It will then be discovered whether there is any blood collected, or matter formed, about the part where the sensitive sole is injured, which is a matter of very great importance, as the success of the treatment depends on knowing the exact condition of the corn.

The matter which forms may pass under the sensitive sole, quite undermining it, or it may pass out at the coronet. In these cases, it is essentially quittor, and requires the same treatment.

The only diseases it might at all be taken for are quittor

and canker; but the examination, by paring away the sole as recommended, will clearly determine simple corn.

Causes.—Corn is, perhaps, a disease peculiar to the domesticated horse, and generally so to those that have been shod. Corn is always the result of pressure on the horny sole, at the point where the disease occurs, thus bruising the sensitive sole, and causing a little blood to ooze from it, or be extravasated. The secretion of horn from the bruised part of the sensitive sole, is changed, being less in quantity, and of a spongy character. The blood which had oozed out tinges this soft horn, giving it the dark red color seen in examining the sole for corn.

Contraction is a very common cause of corn. The heel wiring in, presses on or squeezes the heel of the sole, and bruises it, thus giving rise to corn. But the most common cause is error in shoeing. It is supposed, by some, that shoeing necessarily gives rise to corn; and this may be true, to some extent, for it certainly interferes, in some degree, with the free and natural expansion of the hoof. But bad shoeing vastly increases the liability to corn. I shall now point out the errors in shoeing which generally give rise to corn.

The inner side of the hoof is thinner and weaker than the outer, naturally. Some blacksmiths pare down the inside border of the crust much lower than the outside, which lets the shoe rest on the inner bar, and even on the part of the sole between it and the crust, and which must certainly give rise to corn. The inner heel and quarter should not be cut down, but merely leveled, and if the border is too deep or projecting around the toe, it may be sufficiently lowered, commencing at the inner quarter and paring down around to the outside of the hoof, which may be cut down as low as necessary. The border of the crust should rest on the outer part of the web of the shoe, and around the toe and the forward part of the quarters their outer edges should be even; but from where the quarters begin to turn in, the web of the shoe

should commence to project a little beyond the edge of the wall, and at the heel should show about one-eighth of an inch of projection. If the heels of the shoe are brought in even with the edge of the wall, in a very short time, by the growth of the toe forward, they will be drawn so far forward that the crust around the heel will project over the shoe, and the heel of the shoe will become imbedded in the inside of the wall, on the heel of the sole, and corns will be the consequence.

Neglecting to pare out the dead horn in the angle between the crust and bar will allow the shoe to press on it, causing this malady.

For further consideration of this subject, see the article on shoeing. I must remark, however, that too much attention can not be given to the subject of shoeing. It is often neglected at the expense of a valuable horse.

Treatment.—The paring out of the corn, recommended in conducting the examination of the case, is also necessary to the treatment. Every particle of the affected horn of the sole must be pared out, down to the sensitive sole. By this means the bruised part of the sensitive sole is exposed. If blood or matter is present, it can then escape. If sinuses, or pipes, have formed by the matter burrowing under the sole, they are to be treated as quittor, which see. But if the case is simply a corn, after the horny sole is pared away from over the point bruised, as close to the sensitive sole as possible, being careful not to wound it, take a plug of tow, and dip it in pitch and press it firmly into the cavity. Healthy horn will then be formed in place of that before diseased. A thick shoe should be put on, well chambered over the seat of the corn, to prevent it from pressing on it. A bar shoe might be worn for a short time, to make the shoe sufficiently strong not to break where it is thinned over the corn.

WOUND OF THE CORONET—TREAD.

Under this head may be classed all wounds of the coronet of a similar character to those produced by the calkin (or, as some call it, the *cork*) of one shoe, on the coronet of another foot.

The wound is generally of that character called a contused wound, bruised and cut, or torn.

Symptoms.—A careful examination of the wound should be made, and if any dirt, gravel, or sand, or other foreign thing be found, it must be removed. The extent of the bruise and cut, if any, must be carefully determined. Inflammation and lameness are most common accompaniments. At a later period considerable suppuration or mattering may take place. If tread is badly treated or neglected, it may terminate in false quarter, quittor, or it may take on gangrene, (mortification).

Causes.—An improperly formed shoe will most certainly cause the horse to either calk himself, or wound the coronet with the lower border of the shoe. Any thing capable of bruising and cutting the coronet may cause tread, or wound of the coronet.

Treatment.—In the first place, cleanse the wound and remove any dirt, sand, or gravel, and clip off any bits of torn and hanging skin. This being done, fill the wound with balsam of fir, and put a piece of muslin over it. Then wrap the coronet with a long roller or bandage, and keep it wet with water, one pint, and tincture of arnica, two ounces, mixed. If the wound seems to be foul and not disposed to heal, a pledget of tow, dipped in Venice turpentine, may be placed in it, and renewed once or twice a day, until the wound looks healthy, and then use the balsam of fir. If it should seem to be about to take on gangrene, or mortification, use a poultice of charcoal and balsam of fir.

Particular care should be taken not to cut through the

coronary ring, or it will cause an open space, or permanent crack in the hoof.

QUITTOR.

Quittor is an ulceration, or the formation of matter, in the sensitive parts within the hoof, generally originating in the sensitive sole or sensitive lamellæ. When, from any cause, matter is formed within the foot, and where there is no direct outlet, it forces itself along through the soft parts, often in several different directions, forming sinuses or pipes. These pipes pass along until they find an outlet, which they will do some place above the hoof.

Symptoms.—Before the pipe has opened above the hoof, it is somewhat difficult to determine the case. There is nothing in the lameness to direct to the true nature of the case: though, by examination, it will certainly be found to be in the foot, and this may be found to be hot. If the case has originated from corn, or gravel, an examination of the bottom of the foot, to find if either of them is the cause of the lameness, will show whether they have progressed so far as to cause matter to be formed.

If it has proceeded from the prick of a nail entering the quick, when the nail is drawn out a little matter or pus will very likely follow it; or the smith may know of the nail having entered the quick, and if he does not, he certainly has not sense enough to be a blacksmith's assistant.

But when the sinuses or pipes proceed from a hurt about the upper part of the hoof, at the heel, the opening will generally show the nature of the case. The opening will generally be above the inner quarter, and not very large, the matter merely forcing out in small quantity. No accurate idea of the extent of the ulceration within can be formed from the quantity of matter thrown out. Pipes may extend in every direction, even into the coffin-joint, or the sensitive and horny lamellæ may be almost entirely separated by the ulceration,

and yet but little pus or matter be discharged at the opening above the hoof.

The extent of the fissures or pipes can best be found out by taking a small-sized *bougie*, (it has no other name), which can be got at any drug-store. This can be passed into the opening and will easily pass in the direction the pipes run. It may be used when the opening is above the hoof, or when a hole has been made through the sole. It is the best probe that can be used, as it will follow the sinuses wherever they run. Sometimes it happens that the parts above the hoof become much enlarged and are liable to be bruised by the other foot.

If quittor is neglected, its termination will be the destruction of the foot, either the hoof becoming separated and coming off, or the coffin-bone ulcerating and becoming destroyed. But before these results will have been reached, the ulceration may have reached and destroyed the coffin-joint. A true quittor can hardly be mistaken for any thing else. A close attention to the condition of the case is about all that is necessary to determine the disease. It may terminate in canker, but when it does the symptoms of canker will be so clearly seen that no difficulty need be experienced.

Causes.—Any thing capable of exciting inflammation at any point in the sensitive parts, which are the seat of the disease, will cause quittor. I have spoken of corns, gravel, and pricks of nails entering the sensitive little plates on the coffin-bone, as causes. In the language of Mr. Youatt, "It may be the result of any wound in the foot, and in any part of it." A bruise of the sole, overreach particularly, when badly treated, is a frequent cause.

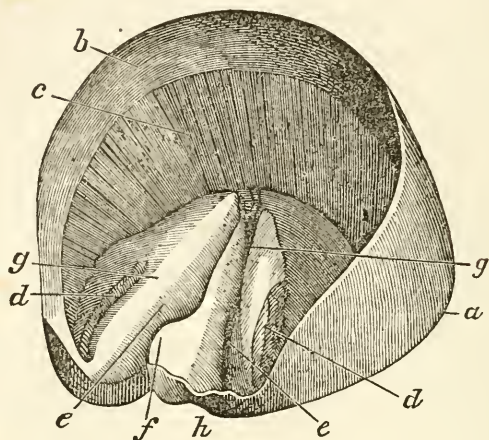
Treatment.—If it can be ascertained that the quittor is caused by a wound or bruise of the sole, or the pricking of a nail, make a free opening through the sole at the point of injury, and let the matter out. Also, if the quittor start from above and burrow down until any of its pipes reach the sole, a similar opening is to be made at the point where the pipe

extends to. After once getting the quittor opened and discharging matter below, the treatment can be successfully applied. After opening the quittor at the sole, a flax-seed poultice should be applied and kept on for several days, changing it twice a day. It will cause a discharge of healthy matter, and incline the quittor to heal. If it is not getting along well by the poulticing, nitrate of silver, forty grains to the ounce of rain-water, may be injected into the sinuses once a day, with a glass syringe, for two or three days, after which use only ten grains to the ounce of water, the poultices still being continued if the quittor closes at the coronet after being opened below. But, on probing the opening at the coronet, it will sometimes be found that it only extends a little way down; then, by injecting it twice or three times a day with tincture of aloes and myrrh, a cure will be easily effected.

Another plan of treating quittor is to make a slim tent, of tow or flax, as long as can be passed into the sinus or pipe, and soak it in Venice turpentine, and introduce it into the pipe. If it does not stay in well, it can be held in by a bandage, or strip of sticking-plaster. After a few days matter will flow freely, and if the cure is going to be successful, the matter will be of a yellow, healthy appearance, and the quantity decrease. The tent must be removed, cleansed, and soaked in the turpentine, once a day. It would be well to inject the pipe with salt-water, when the tent is taken out, to cleanse it. After the tent has been used about a week, if the case is doing well, a shorter tent may have to be used, for the sinuses will be filling up. If proud flesh should appear it may be removed by the use of burnt alum, in powder, freely applied to it. Another good treatment for quittor is to inject the sinuses with the ointment used in fistula and poll-evil, twice a day. It will have to be softened for this purpose.

The horse should be kept quiet, on a soft dirt floor, and fed light diet. A good, cleansing physic would be useful at the commencement of the treatment, and repeated in a few days.

Some cases, especially where the coffin-joint is involved, will require time and patience in treatment.



VIEW OF THE INSIDE OF THE HOOF.

- a*, The external or outside crust, seen at the quarters.
- b*, The coronary ring which throws out the hoof, supplying its repairs.
- c*, The little horny plates, called springs, on which the weight of the horse is borne, called lamellæ.
- d*, The lamellæ continued over the bars.
- e, e*, The two concave or hollow surfaces of the inside horny, or outer frog.
- f*, This is the cleft of the frog, when viewed on its outside.
- g, g*, The bars, shown on the inner side.

PUMICED FOOT.

This is either a partial or entire separation of the sensitive and horny lamellæ of the foot, permitting the coffin-bone to settle down, or descend and rest on the sole. This causes the sole to become flat, or even convex, the weight resting on it, instead of on the lower border or inner surface of the crust.

Symptoms.—The symptoms presented do not always clearly indicate the extent of the mischief. When the lamellæ are only partially separated, or have lost their elasticity and become stretched by the weight resting on them, the coffin-bone

will still be partially suspended, and, though it descends and rests on the sole, its full weight does not have to be sustained by it. In this case, the sole will become flat, or slightly convex, and the crust or wall fall in from above, to some extent. This condition may remain for some time and no great change of the condition of the parts within the hoof take place, except a gradual wasting away of the sole, by absorption, where the coffin-bone presses on it. It sometimes happens that a disposition to unite takes place in the parts thus separated; and this adhesion may be quite firm, and something like a cure be the result. It is, when the case is of this character, no part of the hoof being broken, that a cure, by the means I shall describe, when I come to the treatment, may be more confidently hoped for. This form of the disease is most likely to be the result of the less active inflammation of the foot.

But very soon after active inflammation has taken place in the structures or parts within the hoof, an entire separation of the sensitive and horny lamellæ sometimes occurs, permitting the coffin-bone to descend and rest its entire weight on the sole. In this case, the sole rapidly descends, absorption takes place very fast, and consequent thinning of it, and, finally, being unable to sustain this unnatural weight, the sole bursts loose from the wall, thus exposing the internal, sensitive parts of the foot. Of the intensity of misery and lameness, in such a case, imagination can furnish a better idea than words. Great changes within the foot take place. The structure, as well as the situation of the parts, becomes changed.

Causes.—As has already been suggested, inflammation of the lamellæ of the foot by founder, or any inflammation, is the principal cause of pumiced foot. In the state of health, the union of these little plates is so firm that they are able to bear a force equal to many thousand pounds; but after being the seat of inflammation, this union is soon destroyed. Any thing capable of producing inflammation of the parts within

the foot may result in a pumiced foot—severe and long continued strain of these little plates, hard running, etc.—the worst form generally following active inflammation, or coming on after the milder type of the difficulty has existed for some time. The type of the disease which is not attended with a breaking of the sole is more commonly the result of the less active inflammation of the foot, or chronic founder.

Pumiced foot is not difficult to determine, when of the more severe type; that is, when the sole is broken. The flattening of the sole, and its evidently becoming thinner, with the peculiar sinking in of the crust in front, and the lameness always present, will distinguish it from the common flat-foot we sometimes meet; also, the walking on the heel and elevation of the toe.

Treatment.—This is one of the most serious misfortunes to which the horse is liable. Yet I am not of the opinion that all cases are out of the reach of benefit by proper treatment. The treatment I would adopt consists of a double shoe. With this arrangement, a constant pressure, which is increased from time to time, is kept up on the sole, and the coffin-bone, by this means, raised to its proper place. The first shoe is made just as an ordinary shoe, except that there are three projections at each side; a hole passes through each of these projections, and a thread is cut in it to receive a screw. This shoe is put on just as any other; but the hoof should be very carefully pared, and the wall made thin as possible, so as not to leave it any stiffer than necessary. Another shoe just the size of the former, but with no nail-holes, and having the same side projections as the other, but the holes through them being smooth, is made. This shoe is to have two bars across it, and another across them—the first a little back of the quarters, and the second between it and the toe. Six screws with square heads are to be made. They should be a little longer than the thickness of the two shoes. The first shoe is now to be filled up with several thicknesses

of sole-leather; the first piece fitting the sole accurately, the next not being quite so broad, and so on, so that the greater pressure will be on the center of the sole, which requires to be most raised. The necessary number of leathers being fitted, the outer shoe is to be put on by means of the screws. Enough leathers should be put on so that the two shoes will not come quite together at first. In a few days the screws may be tightened a little, and so on until the two shoes come together. Enough leathers should be put on at first to raise the sole to its natural position by the time the two shoes are brought together. The shoe should remain on until the wall of the hoof has grown about two-thirds of its length, which may be known by making a mark on the wall near the hair, and noticing its descent. The horse should be kept on a soft floor, or may be turned on grass.

The effect of this contrivance is, as every anatomist knows, that, as the hoof and the lamellæ are produced at the coronary ring, they are brought together, and, both growing out, will be united and held together, until enough is thrown out to hold them in until they finish their union, after which time the pressure may be removed by taking off the shoe.

THRUSH.

A disease sometimes called *frush*. It is characterized by a discharge of matter from the cleft of the frog, of a peculiarly offensive smell. It is the result of inflammation of the lower surface of the sensitive frog; its usual secretion of horn being changed, or partly changed, into pus or matter. It occurs more frequently in the hind-foot than in the fore one.

Symptoms.—In many cases the only means of ascertaining the existence of thrush is the peculiar smell, or, by a very careful examination, the hoof showing no change in shape, and the frog not at all tender. The cleft of the frog will generally be found lengthened and deepened, the fissure often

extending to the sensitive horn within, and from this the discharge constantly issues. The progress of the disease is often very slow, but with no disposition to heal. After awhile the frog commences to draw up or contract, becoming tender, rough, and brittle, the discharge becoming more abundant and more offensive. The horny frog disappears, or seems to be wasted away by the continued discharge, and a mass of hardened mucus takes its place; but this scales off very easily, leaving the sensitive frog uncovered. Masses of fungus or proud flesh sprout up in this opening, and extend to the parts around; the sole becomes undermined and the whole foot involved in canker.

The tendency of this disease is to destruction, and nothing can be more erroneous than to suppose it a matter of no consequence. It should never be neglected, however trifling the attack may seem to be.

Causes.—Thrush may be caused either by the effects of other diseases or by violence to the frog of any kind. Contraction, by pressing on the frog, will cause it. Improper shoeing, exposing the frog to unusual violence, will also produce it. Exposure of the feet in filthy stables, allowing the horse to stand with his feet in a mortar of dung and urine, will give rise to irritation of the frog, and thrush. Contraction is apt to result from thrush.

It is oftener met with in the hind-feet than the fore ones, most likely from their greater exposure to filth. It may occur at any age or any season. Colts at grass have been known to have it.

Treatment.—The thrush should be properly cleaned out by washing with soapsuds, and dried, and the loose horn pared off. Then use the same ointment recommended for scratches, or grease, with the addition, to the quantity there recommended, of *powdered blue vitriol*, one ounce. To be applied once a day, and the heel washed well with soapsuds and dried before applying the ointment. When masses of fungus, or

proud-flesh sprout up, they should be freely touched with a stick of nitrate of silver, commonly called caustic. The caustic may be forced into the spongy growth freely, so as to destroy it at once.

A physic every four or five days will be of advantage. He should have, once a day, in his feed, an alterative. Equal parts of sulphur and powdered sassafras, a table-spoonful to be given at a dose, will answer the purpose very well.

CANKER OF THE FOOT.

A morbid or diseased condition of the sensitive sole, or of it and the sensitive frog, causing the separation of the horny sole, and a growth of fungus flesh to sprout up and occupy its place, has been called canker.

Symptoms.—As canker is generally a secondary disease—that is, results from other diseases having progressed until the sensitive sole and sensitive frog become diseased—the earlier symptoms would be such as attend those diseases. The diseases which more frequently result in canker are quittor, corns, and thrush. Great tenderness of the bottom of the foot, and lameness of the severest character, attend from the first of the disease. And these, of course, increase as the horny sole and frog become absorbed or wasted away by the increased fungus growth which takes their place. Indeed, the symptoms of canker may be said to steadily progress, from bad destruction of the bottom of the foot and lameness, to worse and worse, until the foot is entirely destroyed or the animal dies.

It may be distinguished from thrush by the fungus or proud flesh in it only occupying the place of the frog, while in canker it extends to the bars and sole. From quittor, by the absence of fungus growth in quittor, while it may be properly so called, it is, indeed, canker, and nothing else.

Causes.—Thrush, quittor, and corns have been spoken of as running into canker, or causing it. Bruises and punctures

may bring it on. It is much more common in heavy draught or dray-horses, with large, broad feet; indeed, it is almost exclusively confined to such horses. It is said by authors to be hereditary. Filthy, bad stabling is doubtless one of the main causes of canker.

Treatment.—The objects to be accomplished in this disease are, to remove the fungus growth and the dead parts of the horny sole, so as to leave the surface of the sensitive sole in a healthy condition, when it will be capable of secreting or throwing out new horn, to take the place of that destroyed by the disease. The first thing is to remove the fungus or proud flesh. The large masses of it may be shaved off even with the sole, with a sharp knife, being careful not to wound the sensitive sole. The surface then left should be freely touched with a stick of nitrate of silver, until a white, skin-like surface is left. The stick may be freely pressed down into any lumps of fungus left. As soon as the greater part of the fungus is removed, all dead or loosened portions of horn should be pared out. After applying the caustic, a poultice of flax-seed should be applied, which can best be held on by the leather boot, which is made to slip over the foot and tie around the pastern. The caustic is to be applied to the fungus once a day; but after any part of the sensitive sole has become uncovered and healthy, it must not be touched any more with the caustic. The chloride of antimony is a superior article for removing the fungus that remains after the knife has been used. The part is to be touched with it once a day, but not the sensitive sole, after it has commenced secreting new horn. A thick piece of cloth, spread with balsam of fir, will answer quite as good a purpose as a poultice, and is easier kept on.

While undergoing treatment, the horse should be carefully kept where his feet will be dry. He might be used in light work, as in a bark-mill. He needs some exercise. Time and patience are necessary in treating this malady.

STRAIN OF THE COFFIN-JOINT.

The coffin-joint is composed of the union of the coffin-bone, the navicular bone, and the lower pastern-bone. This joint is a little below the coronary ring.

Symptoms.—Lameness suddenly coming on, with heat and tenderness low down around the coronet. It is very difficult to determine this injury, owing to the parts being covered up by the hoof in which it occurs. The absence of injury in any of the other joints near it should always be determined before locating the cause of the lameness in the coffin-joint.

Causes.—Any violence so applied as to throw the force on it, may strain this joint. It is not very common, however, that it is injured. It is well protected from concussion by the extensive elastic structures about it. Getting the foot fast is most likely to strain this joint. It should be promptly treated, for irreparable mischief may be the result if it is not.

Treatment.—The first object is to prevent inflammation taking place; or, if it has already set in, to reduce it. For this purpose remove the shoe, wash the foot, put the horse on a soft floor, and wrap the foot with a broad, long bandage, and keep wet with the following "*cold lotion*:"

Take—Saltpeter.....	4 ounces.
Sugar of lead.....	1 ounce.
Muriate of ammonia.....	1 ounce.
Common salt.....	1 pint.
Water.....	4 gallons.

Mix.

A cooling physic may be given every two or three days. Light diet, as scalded shorts, bran, etc.

TUMORS.

SEVERAL different kinds of tumors or lumps appear under the horse's skin, generally originating in the soft white flesh or cellular tissue which connects the skin with the muscular covering of the body. Most of such tumors are slightly movable. Some kinds grow to an enormous size. Some are hard or gristly all through; others only part of the way, and the center filled with thick fluid; still others have only a thin wall and the inside filled with quite thin fluid.

Treatment.—Repeated blisters over the tumor in its first appearance may put some kinds back, but the radical treatment is to take the tumor out with a knife. The skin is cut over the tumor from side to side by two incisions, one running across the other. The skin and the flesh, if any between it and the tumor, is then dissected back so that the outer side of the tumor is uncovered. It is then to be dissected off. A simple flesh wound is left, which is to be cleansed of blood with cold water, and the flaps of skin sewed up. Dress with compound tincture of myrrh. Secure the horse in a stall so that he can not tear the wound open. Any artery of consequence that may be cut is to be tied.

Tumors on Tendons.—Hard tumors sometimes come on the tendons and ligaments about the joints, from bruises or strains. They are fast to the tendon and not movable. They should not be interrupted.

An Aneurism is a tumor formed by the rupturing or breaking of the inner coat of an artery. It is a soft, throbbing or pulsating tumor. It may be operated on by a good surgeon, but an inexperienced hand should not undertake it.

MELANOSIS.

Tumors, varying in size from a merely perceptible kernel to several pounds in weight, are sometimes found under the skin,

or more or less imbedded in the muscles and cellular tissue. They present an irregular appearance, and a sort of knotted feel to the hand. When cut open they are found to be of a fibrous structure, with a dark-colored inside, and exude a dark-colored fluid resembling coal-tar. These tumors are most common about the shoulders and tail. They may be found about the eyes and jaws, or, indeed, any other part.

Treatment.—The only successful way of treating such tumors is to cut them out. The horse should be cast in the most convenient way, and then firmly secured or given chloroform. The operator will then lay open the skin and flesh down to the tumor by two incisions crossing each other. He will then dissect back the four flaps until he reaches the edge of the tumor, when he proceeds to dissect it up from its attachments underneath. He should be careful to dissect around any large arteries or nerves in the way. An assistant is to sponge away the blood with a sponge squeezed out of cold water, while the operation is going on. If any considerable artery is cut during the operation, it must be tied. After the tumor is removed, sponge out the wound and bring the flaps together, and close the cuts by a proper number of sutures.

Place the horse in a stall where he can not possibly rub the wound, and keep it dressed with cloths wet in cold water, or, after a few days, dress it with compound tincture of myrrh.

WARTS.

These are hard excrescences which appear on various parts of the body. They are very commonly found about the face and nose, and along the belly and flanks. They are very troublesome when large or in situations where they get rubbed. They vary in size from a pea to a pound or more in weight. I took one off the pastern-joint which weighed one and a half pounds. They have their roots in the skin.

Treatment.—If the wart has a broad base, take a curved needle, armed with a double cord of saddler's silk, and pass it

through the base of the wart, then cut the needle off. There are then two cords through the wart. One of these is to be tied around one half, and the other around the other half, drawing them very tight, and tying with a *surgeon's knot*. If the wart has a stem or pedicle, tie the cord around it. After being thus ligatured, the wart will drop off in a few days. The sore that is left may be treated as a simple ulcer; it is nothing else.

Warts may be removed by the application of caustics, as caustic potash, arsenic, or corrosive sublimate. I prefer removing them with a dull red-hot iron, called actual cautery. Apply the iron to the stem or pedicle of the wart, and it will fall in a few seconds. After it is off, if the roots are likely to sprout up again, apply some caustic; either of those just mentioned will answer. Treat the ulcer left as before directed. Some warts may be clipped off. Nitrate of silver, twenty grains to the ounce of water, makes a good dressing for the ulcer left after a wart is removed. Dip a feather in it, and apply to the ulcer once a day.

SITFASTS.

A sitfast is a hardened, thickened, and elevated portion of the skin, of a dark color, with edges more or less raised, and extremely sensitive, the horse scarcely allowing it to be touched. It resembles a corn in the human patient. Sitfasts come where the saddle or harness exerts undue pressure. Scalds may cause them.

Treatment.—Cut the sitfast entirely out, and heal the wound as any ordinary sore.

WIND-GALLS.

These are tumors, of a puffy character, of variable size, located on the legs, generally about the hough and fetlock. Where the tendons of the muscles are attached, or where they lie close to the bone, and where there would be friction, little

shut sacks are placed, on which the tendons move, to prevent friction. These little sacks are very smooth on their inside surfaces, which secrete a fluid just the same as *joint-water*, to lubricate or moisten the surfaces which lie in contact with each other. These sacks are very numerous near the joints, where there are many tendons fastened. Now, these sacks may become inflamed from undue pressure, resulting from violent action of the tendons, or from blows, etc. One of the common results of inflammation is a thickening of the structure or part inflamed. So wind-galls are often *only* the thickened walls of these little shut sacks, and which, of course, remain thickened after the inflammation has subsided. Still another result of inflammation is, especially in surfaces that secrete any fluid, to cause an excessive quantity of fluid, of a slightly different character, to be secreted or poured out. So it generally happens that, when these little shut sacks become inflamed, their secretion is greatly increased, and, as there is no opening in the sack, it must remain there, and form a puffy tumor, which has been called wind-gall, from the erroneous opinion, formerly entertained, that it contained wind. A portion of the fluid may, however, after a long time, be got rid of by means of absorption, and this the thinner portion, leaving the thicker part of the fluid still in the sack, forming a tumor of greater hardness, but not of the bony hardness of splint.

When the horse is very old, the process of absorption becomes very active, and all wind-galls will then disappear. Few horses are entirely free from these *eyesores*, for, generally, they are only such. When they are first forming, before the inflammation subsides, they may occasionally cause lameness, but after this, unless they attain an enormous size, they do not interfere with the horse's action, or cause unsoundness.

Symptoms.—Wind-galls may be known from their location in the neighborhood of the tendons above the fetlock, and, more frequently, about the point of their insertion, from the puffy

character of the tumor, and the little or no inconvenience occasioned by them.

Treatment.—Constant and firm pressure will remove wind-galls for a short time, but they will return. The daily application of tincture of iodine will sometimes remove them, but a certain cure is to puncture the wind-gall with a sharp knife, and with a glass syringe inject into it a tea-spoonful of tincture of iodine.

BOG AND BLOOD-SPAVIN.

As was observed when describing wind-galls, where the tendons pass over the bones, little membranous sacks or bags are interposed to prevent friction. A similar arrangement of little sacks protects the tendons about the hough. From violent exertion, inflammation is excited in these little sacks; their natural secretion is changed in character and increased in quantity, and a tumor or lump is formed. A vein of considerable size, called the *subcutaneous vein*, passes up the leg a little in front of the inside of the hough. Now, when the little sacks situated beneath this vein inflame and enlarge, they press on the vein, preventing the blood from returning freely along it, and a portion of the vein, below the enlarged sack, swells, forming a tumor of a soft and yielding character, seldom larger than half of a hen's egg.

Symptoms.—The symptoms by which blood-spavin can be distinguished are, the commencement of the vein to enlarge below the swelled or enlarged sack, and its gradual progress of development; also, the slight lameness accompanying, which is most manifest when the animal first starts, after rest. This lameness is often permanent. Blood-spavin should always be regarded as permanent unsoundness, for, though it may be cured, it is almost certain to return again.

The causes of this difficulty have been sufficiently referred to above.

Treatment.—I should lose no time in applying a blister, com-

pletely covering the swelling, but not surrounding the leg. The blister should be applied every third or fourth day, but not putting on new ones while the other runs, until three or four blisters have been put on. But the most permanent cure is firing. The horse should be cast; then several strokes with the firing-iron should be made over the swollen part, nearly up and down the limb, about half an inch apart; other strokes with the iron are to be made, running slantingly across the first, marking the surface over and around the swelling in diamonds. The burning should not go through the skin, but nearly so. After five or six days, a blister should be drawn over the part fired. By this treatment the skin is contracted, and a constant pressure is kept up on the parts that were swollen. Never blister twice, without greasing and washing with warm water and soap, then drying before blistering.

THOROUGH-PIN.

An enlargement, of a soft, puffy character, appearing in the space between the hamstring and the lower end of the thigh-bone, above the hough.

It is an enlargement of one of those little sacks placed in the neighborhood of joints and ligaments, called *bursæ mucosæ*, and which are particularly described in the article on "Wind-galls." Indeed, thorough-pin is identically of the same character as wind-galls. The enlargement may appear only in one of the spaces in front of the hamstring; but it generally appears at both sides—hence the name thorough-pin. The enlargement may be small or of considerable size, somewhat injuring the appearance of the hough; but it is only an eyesore, seldom producing lameness, and is not regarded as an unsoundness, though it is an evidence of the horse having passed through some rough usage. From the above description it will readily be recognized or known, and its causes sufficiently understood.

Treatment.—The treatment for thorough-pin is the same as recommended for wind-galls.

CURB.

An inflammation and swelling, terminating in a callous tumor or swelling, about three or four inches below the hough.

It should be borne in mind that many tendons are held in place by broad, ring-like ligaments, through which the tendons pass, these ring-like ligaments being firmly attached to the bone. These loops, or rings, are lined with a smooth membrane, which secretes a fluid to keep it as if oiled, to avoid friction. The tendon is also covered with a smooth, delicate membrane, called its sheath, to further aid in preventing friction, by the motion of the tendon. But by violence to the part above described, either to the sheath of the tendon or the ring-like ligament, inflammation is excited, giving rise to the following

Symptoms.—Heat, tenderness, and swelling in the part affected, with considerable lameness from the first, are the usual symptoms of the earlier stage of this malady. The heat and tenderness will only be observed in the first or inflammatory stage. After this, the presence of the callous tumor, or swelling, will be the only local symptom of curb; and this may present such a uniform elevation as to be overlooked, even by an experienced eye. Its size varies considerably, sometimes being so small as to be but barely perceptible; in other cases, so large as to present the appearance of deformity.

In examining curb, the hand should always be used, as it is important to ascertain not only the existence of the tumor, but its size and the stage of its progress, by which a better idea can be given of the prospects of treatment.

After the inflammation subsides, the lameness does not entirely disappear, but is not so great as at first, and is of somewhat different character; and, indeed, might be called a stiff-

ness. The horse steps quicker with the affected limb than with the sound one, which is doubtless occasioned by the obstruction the tumor causes when the other leg is forward; he steps further with the unsound than the sound one.

Causes.—Hereditary influence is generally conceded to have something to do in giving rise to curb. Certainly, if a horse inherits a natural weakness of the tendons and ligaments of the parts which are the seat of the difficulty, he will be peculiarly liable to “throw out curb.”

Horses with a hough of that peculiar shape known as “*cow-houghed*,” in which the hough sets in like that of the cow, are very liable to curb. The reason is very obvious, for the tendon, instead of working in a straight line through the ligament, works strongly against one side of it. Young horses are more liable to curb than older ones, for their muscles and ligaments, not being so solid, are not so well calculated to resist injury or violence.

The immediate causes of curb are overexertion, sudden and violent action, in such a way as to bruise the sheath of the tendon where it passes through the ring-like ligament, or the lining membrane of the ligament itself, or kicks or blows on the same parts. Whatever may be the injury producing it, inflammation is excited in the parts injured, which goes on to one of its peculiar terminations, the throwing out from the inflamed part a thick liquid, called *coagulable lymph*, but which soon commences to become harder and harder, until it becomes of an almost gristly character, as felt in a curb of long standing. It does not present the proper character of a tumor, but an enlargement or great thickening of the membrane which is the seat of the disease.

Treatment.—In treating curb, the object, in the early stage, is to reduce the inflammation and prevent the formation of the callous enlargement. For this purpose there can be no better remedy used than the following:

Take—Muriate of ammonia.....	2 ounces.
Water.....	1 quart.
Tincture of poison hemlock.....	4 ounces.

Dissolve the ammonia in the water, and then add the tincture of hemlock. Apply a roller or bandage so as to cover the tumor four or five thicknesses, and keep wet with the above solution.

The first prescription recommended for splint is good in any stage of curb. The second one recommended for splint is good for curb, after the tumor has become hardened.

In the acute or inflammatory stage of curb, the horse should have rest. Frequent rubbing of the tumor, in curb, is of advantage.

CAPPED HOUGH.

This is a swelling or tumor, of a soft character, appearing on the point of the hough where the great tendon, called the hamstring, is attached to the upper bone of the hough. It is simply an enlargement of one of those little sacks situated near where the tendons are attached, and which are fully explained under the head of "Wind-galls." This tumor may become large and callous (hardened) after remaining some time. It seldom produces lameness. This description will enable any one to understand the affection as well as the stage of its progress. If the tumor is still soft and yielding, it may be treated with advantage, but if callous, it is out of our reach.

Causes.—These are blows, kicks, or other violence to the point of the hough. Lying on a hard floor, or even a strain, may cause it; but the manner in which it is most frequently produced is by the horse kicking, not only in gears, but even in the stable. Hence, when capped hough is found, it may safely be regarded as circumstantial evidence of viciousness, and the buyer should have satisfactory evidence to remove his suspicion.

Treatment.—The free application of tincture of iodine, every day, over the swelling, will reduce it. Tansy, hoarhound, and wormwood, boiled together to make a fomentation, and bound to the part, and renewed three times a day, will cure it.

The solution of tincture of poison hemlock, recommended in swelled hough, kept on this swelling, will doubtless cure it.

ENLARGEMENT OF THE HOUGH.

No particular description of this ailment is necessary, as the name sufficiently indicates the seat and appearance of the malady. There are two stages of the difficulty which it is important to bear in mind. The first is the inflammatory stage, and the second the chronic stage, or stage of permanent enlargement.

Symptoms.—After being exposed to whatever violence produced the difficulty, the hough-joint generally, no particular part of it seeming to be especially affected, commences to swell, and all the other usual symptoms of inflammation appear, as heat, pain, and tenderness, and also very great lameness. This inflammation of the hough may continue for a few days, and gradually subside, leaving the part quite well. But it is not safe to trust to nature to effect the cure thus, for in many cases, instead of pursuing this course, a very different one will be taken. The heat, pain, tenderness, and lameness gradually pass away, but the swelling still remains. In this case the inflammation has terminated in a thickening of all the ligaments and membranes which were affected.

Causes.—Overexertion, checking up suddenly at great speed, too great weight, or concussion from any cause, may give rise to inflammation of the hough. When the inflammation has passed away, leaving chronic or continued enlargement of the hough, though the horse may perform ordinary labor quite well, any strain of the part will be very liable to cause a return of the inflammation and lameness. A horse with an enlarged hough is unsound. One day's hard labor may bring on lameness from which he will never recover. It should always be borne in mind that a part which has once been the seat of severe injury or disease will be more liable to give way afterward than if it had never been affected.

Treatment.—In the first stage of the disease, in which inflammation is present, a roller or bandage of flannel should be so applied around the hough as to cover the affected part several folds thick. This is to be kept constantly wet with a solution of four ounces of tincture of arnica to one quart of cold water.

If the disease is not treated until the stage of chronic enlargement has taken place, or if the above treatment fails to entirely reduce the swelling, put a blister on one side of the leg, covering most of the swollen part, and after it is well, blister the other side, and when this is well, blister again in the same place where the first was applied, and so on, changing the blister until the cure is effected.

Or, keeping a bandage on for a long time, and keeping it wet with the following solution, will cure it:

Take—Muriate of ammonia.....	$\frac{1}{2}$ pound.
Tincture of poison hemlock.....	8 ounces.
Cold water.....	1 gallon.

Mix, and keep in a well-stopped jug.

The application of the tincture of iodine, twice a day, to an enlarged hough, will cure it. I seldom use any thing else in this and similar swellings, after the inflammation has been subdued.

FISTULA, OR FISTULOUS WITHERS.

Fistula is an abscess occurring about the withers of the horse. It usually appears at one side of the withers, generally forward at about the place where the collar rests; sometimes as far back as where the front part of the saddle rests, or at any point between these places; and it may even appear as low down on the side of the shoulder as the upper edge of the shoulder-blade.

Symptoms.—The first indication of the formation of a fistu-

lous abscess that will be likely to attract attention, is the appearance of a swelling at some one of the points above described. This is not a prominent, but rather a flat, broad tumor, and may be quite round or oval. On examination by the hand it will be found hot, tender, and evidently deep-seated. If matter has not formed, the tumor will be of a uniform hardness all over, and much care should be exercised in examining it to determine this point. The ends of the finger pressed over the swelling will soon detect a soft place at some point of the tumor, if matter has formed. The tumor may become quite large before matter or pus is formed, or it may be formed while it is of no considerable size.

If the tumor is let proceed, it increases in size, occasionally becoming enormous, and at the same time the matter, or pus, which at its first commencement was deep-seated, points toward the surface or skin, and in from one to two weeks will have properly "come to a head," as it is called, when the tumor opens, discharging an enormous quantity of pus, often mixed with blood, or bloody matter.

During all this time the health of the horse remains good, and there is little or no lameness; none, unless some important muscle becomes affected from the inflammation around it.

Such is the ordinary progress of this malady from its earliest stage up to the time it matures and commences to discharge matter. But it does not, like a healthy abscess, stop at this point and commence to heal. On the contrary, the walls or sides of the abscess thicken and continue to discharge matter, which becomes more and more offensive as the disease progresses. Every thing seems to be rotting away around and beneath it, and the abscess is said to be burrowing in the parts about it. Large sinuses, or pipes, as they are generally called, form along the course of the muscles in contact with the abscess, and thus the ulcerating process continues to extend until nearly all the muscles of the shoulder are traversed by it. Sometimes it passes down between the

shoulder and chest, and opens out at the back of the forearm at the point of the elbow, or it may open in front of the arm.

Not unfrequently the broad processes of bone which rise up from the back-bone to form the elevation of the withers, as well as the shoulder-blade, may be attacked and wasted away by the ulceration.

Thus the disease advances, becoming worse and worse at every stage of its destructive march, and the poor animal is doomed to drag out a miserable existence, from which there is no escape until the weary powers of life succumb to the exhausting ravages of the disease.

Causes.—The immediate cause of fistula is an inflammation starting at some point deeply seated in the part of the shoulder or withers where the disease occurs. The particular tissue or structure in which this inflammation begins has not been pointed out, whether it is the cellular tissue, the sheath of the muscles, or the lymphatic vessels. (For a description of "The Lymphatic Vessels," see the article under that head in another part of this work.)

The causes which are universally given by authors as producing fistula are, the effects of bruises produced by strokes, tight collars, striking the withers against beams in a low stable, the biting of other horses, and especially the saddle pushing too far forward. So long, generally, and often have these causes been assigned, both by learned veterinarians and the people generally, that it would seem like presumption to question the correctness of this opinion.

Nevertheless, from a careful study of the nature of the disease, and many observations which I have made within the past few years, I have become convinced that a far more important cause is lurking in the dark, and plays a leading part in the production of fistula and poll-evil.

I regard poll-evil and fistula as of scrofulous origin. They are the local manifestation of disease existing in the constitution. It is well known to physicians that a large

proportion of the human family have the seeds of scrofula in their systems, and that it is liable to manifest itself at any time of life in some of its many forms, whenever any exciting cause is brought to affect the person; or it may commence without any particular provocation. I shall now state a few of my reasons for this opinion, and for rejecting the common view of the causes of fistula and poll-evil.

In some particular countries, States, and localities, these diseases are very prevalent, a large per cent. of the horses being affected by them, while in others they are of very rare occurrence—indeed, almost unknown—whereas the accidents and violence to which they are attributed are very generally distributed, being of quite as frequent occurrence in one locality as another.

Some breeds of horses are so perfectly healthy that disease of any kind is seldom met with among them. They are equally exempt from fistula and poll-evil, though it can not be supposed that they are less exposed to the accidents referred to than others.

Some horses may be bruised ever so much by the saddle pushing forward, by the collar, and stand in a low stable with a low door, and often have severe strokes about the withers, and may be beaten over the head with a club or whip-handle, or even knocked down, and yet never show any disposition to either poll-evil or fistula, the bruises getting well just as they would on any other part of the body.

It may be safely stated that no positive evidence of any injury can be found, in five cases out of six that may be met with; but, on the contrary, in more than one-half of them there are strong evidences that there had not been a possibility of such injury.

It is not unfrequently the case that, when treating a horse for fistula, or soon after he has got well, he will take poll-evil; or when treating for poll-evil, or cured of it, he will take fistula; or he may have fistula on one side, and in the same

way take it on the other. It can hardly be supposed that an animal already laboring under one of these affections would so abuse himself as to provoke the other, if it takes a bruise to produce it.

A horse once cured of either is very liable to a relapse, and when it does return, it is quite as likely to be the other as the original form of the disease, and nearly as liable, if fistula, to change its seat to some other point about the withers as to return at the same place.

In three-fourths of the cases I have treated I have been able to discover positive constitutional derangement. The very character of the abscess, its having no tendency to heal after the first opening and discharging its contents, but rather to commence eating in or burrowing, indicates that it is of no healthy character, but must have something peculiar about it, or that it must depend on some constitutional derangement. Indeed, it has almost every characteristic of a scrofulous ulcer on an extensive scale, and if it does, as I am quite certain is the case, commence in inflammation of the small lymphatic glands, then may the question of its scrofulous nature be considered definitely settled.

It is a well-known fact that when the horse is under the influence of internal alterative treatment, the ulcer will heal much more readily than when not under such treatment. In some cases it is almost impossible to effect a cure without constitutional treatment. Dr. Dadd says he has "cured many cases of fistula by treating them as common abscesses, with the application of stimulating antiseptic and tonic poultices, and by a *purifying course of treatment*, with proper attention to diet."

I have been thus tedious in discussing this subject, for it is a matter of the first importance that correct views should be entertained with regard to the nature of diseases, so that measures may be taken to get rid of a diseased stock or to prevent its

propagation, as well as to be able to treat the disease intelligently.

Treatment.—The object in this case is to put back the disease, if possible. If this can not be done, hasten it to a head as quickly as possible, and open the abscess freely; then use medicines to soften the walls of the abscess, so as to convert it into a healthy, healing sore. Also, where the system is much affected, give tonic and alterative medicines.

To put back the tumor, raise a blister large enough to cover the entire extent of the swelling. Roweling will also stop it. I use the following:

Take—Powdered Spanish flies..... $1\frac{1}{2}$ ounces.

Spirits of turpentine. 1 pint.

Mix, and let it stand twenty-four or forty-eight hours.

Shake it well, and pour it in the hand and rub it on the tumor, rubbing it in thoroughly. It will take from three to five minutes to get sufficient of the liquid applied. The second day grease the blistered part with lard, and the next day wash the grease off, and when the surface is dry apply the blistering liquid the same way as before, and continue the blistering the same way until the inflammation and swelling are gone. If the blister does not put it back, it will make it come to a head much sooner than without it.

At the same time the blistering is commenced, give a good physic of aloes, and repeat it every third day while blistering.

If matter has formed, let it come to a head, or hasten it with warm flax-seed poultices, and when it has pointed or come to a head, open it wide. The knife used for this purpose should be very sharp, and should go well through to the matter, and the opening should be made quite two inches wide. If it can be done, an opening from the bottom out at the side should be made, and kept open. Then the following ointment may be used:

Take—Verdigris, powdered.....	$\frac{1}{2}$ ounce.
Blue vitriol, powdered.....	1 ounce.
Corrosive sublimate.....	4 drams.
Resin, powdered.....	2 ounces.
Arsenic.....	3 drams.
Spirits of turpentine.....	1 ounce.
Aloes, powdered.....	$\frac{1}{2}$ ounce.
Alum, powdered.....	$\frac{1}{2}$ ounce.
Fresh lard.....	1 quart.

Mix thoroughly to form an ointment. Put in a wide-mouthed vessel, but keep it well covered.

It is soft enough for use in warm weather, but before using in cold weather the vessel containing it should be set in a pan of hot water until it softens. Squeeze all the matter out of the abscess, and then drop it full of the ointment. Use a spoon or flat paddle to put it in with. The ointment is to be put in the abscess once a day. It should be well stirred before using, every time. This is the only reliable cure I know of which does not leave the horse crest-fallen. If the general health of the horse is much affected, one or two physics a week will be of advantage, and the following alterative treatment will be beneficial:

Take—Flowers of sulphur	4 ounces.
Powdered sassafras.....	6 ounces.
Powdered golden-seal.....	4 ounces.
Powdered poplar bark	8 ounces.

Mix, and give one table-spoonful twice a day, in the feed.

The horse should be kept out of the wet, cold, or hot sunshine. His diet should be green grass, bran, scalded shorts, or any soft but not stimulating food.

POLL-EVIL.

Poll-evil is an abscess, making its appearance on the poll, or nape of the neck.

Symptoms.—The first appearance of poll-evil is an oval, hot, and tender swelling, or tumor, appearing on the poll, or nape of

the neck. If not dispersed, or "*put back*," the inflammation goes on until matter is formed, which points to the surface, and the tumor breaks, discharging a large quantity of thick, offensive matter. It shows no disposition to heal, but continues to discharge; the ulcer, for such it now is, burrows deeper and deeper among the parts in which it is located, causing stiffness of the neck, and finally divides into sinuses, or what are commonly called pipes, which run in different directions, involving the most of the muscles of the neck, rendering the horse a most loathsome object.

Causes.—Among the causes commonly recognized as producing this disease are, the pressure of a tight headstall, the reining down of the head with a martingale which stretches the muscles of the poll too tight, striking the head against the wall or joists when too low, or against any other object. Blows dealt on the poll have doubtless brought it on. Dr. Dadd suggests that neglecting to keep the part clean, passing it by in grooming, may give rise to an irritation of the skin which will ultimately degenerate into poll-evil. Any violence to the part which is the seat of the disease may cause it. The same remarks made with regard to the scrofulous character of fistula are equally true with regard to poll-evil.

Treatment.—The principles on which poll-evil is treated are the same as the treatment of fistula: First, discuss or "*put back*" the disease before matter is formed; second, if matter is formed, let it come to a head, or hasten it with poultices; third, open the tumor or abscess freely, so that the matter will more readily run out; fourth, use such medicines as will cause the hardened walls of the abscess to soften, and leave a healthy, healing ulcer.

The treatment necessary to accomplish these objects is the very same as recommended for fistula, and the manner of using the remedies is the same. The abscess in poll-evil, after it has been opened at the top, may readily be opened at the bottom. Find at which side the cavity of the abscess lies;

then take a seton-needle and pass it down into the bottom of the abscess, and out at the side of the neck, and keep this hole open so that the matter will run out of it. The crooked blade of the seton-needle enables one to perform this operation easily.

SPLINT.

This is a callous, hardened, or bony tumor, or lump, growing on, or near, one of the splint-bones.

In order to clearly understand this difficulty, it will be necessary to consider the structure of the parts which are the seat of the affection.

The leg is composed of three bones, namely, the cannon and two splint-bones. The cannon extends from the knee to the fetlock-joint. It is a long and round bone, and at the upper end, where it unites with the bones of the knee, is marked by a high ridge running from the back to the front of the head of the bone, and another ridge at each side, thus presenting a double pulley-like surface, admitting of a backward and forward motion, but no lateral or side motion. At the back of the cannon-bone, and to the outer and inner edges of it, are situated the two splint-bones. These have a head, and gradually taper off to a point, being thin and flat; they are somewhat thick at the top, but get thinner toward the point. The heads of these bones help to form the surface on which the three lower knee-bones rest; indeed, the inner splint-bone alone supports the inner knee-bone. The splint-bones extend a little more than half-way down the cannon, or shin-bone, lying with their flat surfaces to it, and firmly united to it by a strong, tough, and very elastic substance, called fibro-cartilage, throughout their whole length, which admits of but little motion. The chief object of these bones is to form a large surface for the bones of the knee to rest upon, and, by their peculiar elastic union with the cannon-bone, to break the force of the weight of the animal when thrown on them.

This substance, uniting the splint-bones with the shank-bone, is liable to be the seat of inflammation; and particularly while the horse is young, before this fibro-cartilage has become sufficiently strong. Inflammation may be excited in it by a blow on the leg, by the horse jumping and lighting on solid ground, and like violence; in colts, by putting them on hard roads before this ligamentous substance is sufficiently strong to bear the repeated jars it receives. At the point where the inflammation is seated, a thick, jelly-like substance will be thrown out, forming a tumor; but which soon commences to form bone through it, and finally becomes thoroughly ossified or turned into bone, uniting the splint and large bone firmly together.

When the splint is forming there is generally lameness, but, as it progresses, the inflammation and tenderness subside, and the lameness disappears; though, should the tumor be so situated as to interfere with the motion of the joint or the free action of the tendons, it may cause permanent lameness. Splint almost always makes its appearance on the inside of the leg. This is doubtless because the inner splint-bone is nearer the center of the body, and necessarily receives more of its weight. The inner splint-bone also supports, alone, one of the three lower knee-bones. Raising the inside of the heel of the shoe too high also causes greater weight to be thrown on the inner splint-bone.

An experienced eye will detect a splint at a glance, but it may be known to any person by passing the hand from the knee down along the splint-bones, when, if there is splint, either a smooth or a knotted tumor will be found on or near the splint-bone. The knotted tumor has been called tuberculated splint. Splint may not impair the usefulness of a horse, when not situated so as to interfere with the free action of the joint or the tendons, but it can hardly be expected to be entirely disregarded by the dealer.

Treatment.—If the treatment is applied in the early stage

of the disease, it may have the effect of stopping its progress and reducing the swelling. The following treatment has been used with as much benefit as can be expected in this disease:

Take—Tincture of iodine.....	2 ounces.
Aqua ammonia.....	2 ounces.
Powdered cantharides.....	$\frac{1}{2}$ ounce.
Oil of spike.....	1 ounce.
Oil of hemlock.....	1 ounce.

Mix well, to form a liniment. Apply with the hand, rubbing well, every other day, until the cure is effected. Shake the bottle well before using the medicine.

The next prescription is more active:

Take—Corrosive sublimate.....	2 drams.
Crude mercury.....	1 dram.
Lard.....	4 ounces.

Mix, and rub well together, to form an ointment. Rub the lump with it every third day until it is cured.

BONE-SPAVIN.

A deposit of bone on the inside, and at the lower part of the hough, about the union of the cannon-bone with the small or wedge-bones of the hough, forming a tumor of greater or less size, constitutes what is generally known as bone-spavin. It produces complete stiffness of the bones between which it occurs.

Symptoms.—Many of the earlier symptoms of bone-spavin may entirely elude detection, and the affection, consequently, not be observed until it has progressed to a serious extent. In order to give a complete explanation of the affection, it will be well to recur to the bony structure of the hough. Examining the hough from above, we have the lower head or end of the thigh-bone marked by three ridges and two grooves, from before backward, and resting on a peculiar shaped bone, called the *astragalus*, which is marked by two high, curved

ridges, exactly corresponding with the grooves of the bone above; also, behind this latter bone, the bone above rests against another bone, called the *os calcis*, (spur-like bone), which projects upward and backward, and forms the prominence to which the hamstring is attached. This joint admits of very free hinge motion, but of no side motion. It is the hough-joint proper. These two bones rest on the flat or irregularly concave surfaces, or upper sides of two other bones, the *cuboides* (or cube-bone) behind, and the larger cuniform (or wedge-shaped) bone in front. The larger wedge-shaped bone rests on two other smaller wedge-shaped bones. The cube-shaped bone rests on the head of the outer splint-bone and part of the head of the cannon or shank-bone. The smaller wedge-bone rests almost entirely on the inner splint-bone, and the middle wedge-bone entirely on the head of the cannon-bone. These joints admit of but little motion, except the hough-joint proper, as we have seen. They are bound together by very strong ligaments, and between their points of contact are lined with elastic cartilages covered with the synovial membrane, which furnishes the joint-oil to these many joints. The object of this arrangement seems to be to prevent concussion. The splint-bones are attached to the cannon-bone by firm cartilage; they are placed behind it, one toward each side; they have a head, but terminate in a point about half-way down the cannon-bone.

From the causes, which will presently be explained, inflammation is excited in the cartilage which unites the splint-bone with the shank or cannon-bone; the cartilage commences to become ossified or turned into bone; and, finally, the union between the two bones is changed from the yielding or elastic cartilaginous character to a firm, bony union, precisely of the same character of splint on the fore-leg. This uniformly takes place on the inner splint-bone, but the formation of bony deposit does not stop here. Having once commenced, and the causes still continuing to operate, a hard tumor will be ob-

served to commence forming immediately in front of the union of the head of the splint-bone with the cannon-bone. This bony tumor may continue to enlarge and extend until it has involved the smaller wedges, which lie nearest its origin, thus destroying the slight motion of which they admitted, and consolidating them with the bones below. Still continuing its march, it next reaches the upper or large wedge-bone, firmly uniting it to those on which it rests. It may also extend round so as to involve the cube-bone, behind. This extensive ossification may have taken place, consolidating the several bones involved into one solid bone, as it were, and yet no great degree of lameness be produced, for the motion of which they admitted was but limited. But a more important joint or articulation may be reached, that is, the union between the *astragalus* and the thigh-bone, which is the most important joint of the hough, being, in reality, the true hough-joint. When this is the case, the lameness is so great as to render the horse entirely worthless.

It is proper to remark that the same difficulty may arise from inflammation of the ligaments of any of the small bones of the hough; but such cases are certainly rare, the disease almost always commencing at the point indicated.

I have thus far described the progress of the bony enlargement, which, in size, may vary very greatly, but which can easily be detected by the eye or the hand. But it must not be forgotten that some horses have naturally very prominent houghs, and it is not at all impossible for a careless or inexperienced observer to mistake an unusually large and rugged development of the heads of the cannon and splint-bones for spavin. But a careful examination and comparison of both legs will prevent such a blunder. When spavin is forming, the first thing that will likely attract attention is lameness, which may be of slight or very serious character. When this is observed, a careful examination will usually detect a degree of heat and tenderness in the region of the inner splint-bone.

If the examination is made while there is only inflammation of the part affected, or before a perceptible tumor is formed, it must not be hastily performed. The thumb should be placed against the splint-bone and pressure made in every direction. Mere flinching, at first, must not be mistaken for positive indication of pain, but tenderness must be clearly indicated.

The lameness will continue after the tumor has commenced to form, until the membrane which covers the bone, called the periosteum, and under which the tumor is situated, has accommodated itself to the pressure of the tumor which had stretched it. After this the lameness subsides, or only remains in consequence of the interference of the tumor with the joint. The lameness does not at all seem proportioned to the size of the tumor, often a small tumor being accompanied with very great lameness, and a large one with but little or none. A peculiarity of the lameness of spavin is, that it is intermitting, (goes and comes), the horse being very lame for a time, and then, in a little while, quite free from it. A horse may be quite lame when first taken out of the stable, but become entirely free from lameness after a little exercise. This peculiarity of spavin lameness should never be lost sight of; and if a horse is suspected, he should always be examined in the morning before he has been exercised, or when standing awhile after exercise. A variety of spavin may be met with in which the bony deposit commences in the cartilage between the bones of the hough. This may greatly puzzle any but the most experienced observer. The means of detecting this are, the heat and tenderness about the part, the irregular character of the lameness, the peculiar manner in which the horse lifts his limb, and, finally, the absence of any other cause of the lameness. This case may progress until the joints have become extensively ankylosed, or stiffened, before the tumor appears, but when it does manifest itself, it will be on the inside of the leg.

Causes.—The investigation of the causes of spavin is a subject of more importance than the tracing of its symptoms or

describing the treatment; for, until the causes of this destructive and universally prevalent malady are generally understood and appreciated by our farmers and breeders, we can not expect them to take those precautionary measures which are necessary to prevent its occurrence.

For the purpose of investigation, the causes of spavin may be considered in two classes: predisposing causes, or such as render the system in a proper condition for developing spavin; and exciting causes, or such as immediately cause the disease to commence.

Among the predisposing causes, that which overshadows all others is hereditary predisposition; that is, the colt inherits from its parents a peculiar liability to spavin, so that the slightest exciting cause will be sufficient to bring on the disease, or it may commence at any time without any other cause than the hereditary predisposition, and progress to its most destructive termination.

Indeed, it is conceded by the ablest writers that the disease itself is hereditary—transmitted to the offspring by a spavined parent, just as a large-headed shank-bone, or large joints generally, in the parent, will beget the same type in the progeny, (offspring).

It is hardly necessary for me to say that nearly all this hereditary mischief is the result of putting mares to spavined stallions, or breeding old, broken-down, stove-up, or spavined traps of mares. Such mares are only fit to raise mules from, the mule being proof against disease, and almost so against hereditary taints, and just as profitable to the breeder as the very best colts, which he can not reasonably expect from his old or diseased mares, even though he should breed them to the best stallions.

Certain breeds or stocks of horses seem peculiarly liable to spavin. This should be taken into consideration by breeders; for, though the horse himself may not be affected, if the predisposition exists in the family, his colts will be liable to it.

We come now to consider the existing causes of spavin. Recurring again to the structure of the hough, it will be remembered that the inner splint-bone bears nearly the entire weight thrown on one of the wedge-bones, and also that it is situated near the center of the hind parts, and from these circumstances it has a great weight to sustain. Hence, when the leg is subjected to any undue exertion, this disadvantage is greatly increased and an injury to this part is most likely to take place.

By letting young colts follow the dam when traveling on hard roads, thus exerting and jarring its joints more than they can bear, will give rise to inflammation at the union of the splint and shank-bone, and produce spavin. Allowing it to follow the dam on the farm all day, when she is at work, will have the same effect. Allowing boys or dogs to run colts, making them jump fences or logs, or kick violently, is another manner of producing this mischief.

Setting horses to severe drudgery when too young, or hard pulling at any age, especially in the hands of a cruel or passionate driver, pulling up hill, and breaking or slipping, running through a tough swamp or mire, and especially kicking and missing the object, will cause spavin, as also bad shoeing.

But it must not be forgotten that a horse may escape spavin, even though exposed to any or all of these exciting causes. Nature has "clothed the horse with strength," and when free from hereditary weakness he is not only capable of enduring his ordinary labor, but also of passing through many hardships unharmed. But it is not so with one having the hereditary predisposition; with him the disease is only lying inactive, waiting an opportunity to develop itself.

I have been thus elaborate in discussing the causes of spavin so that farmers and breeders may be induced to guard against propagating this unsoundness, which is now doing more to injure the value of our horses than any other to which the horse is subject. And this becomes the more necessary from the fact that but little can be expected from the most skillful treat-

ment at any stage of the disease, and absolutely nothing in its advanced stage.

Treatment.—To think of being able to cause a bony tumor, which had taken the place of soft parts, to be absorbed and leave the parts sound, is contrary to good sense and experience. But it is a rational object to endeavor to stop the inflammation which is present at any stage of spavin, and to stop the further conversion of the cartilages and ligaments about the joint into bone.

To accomplish this object, let the hair over the tumor be clipped off as close as possible; then—

Take—Gum euphorbium	1 ounce.
Powdered cantharides	1 ounce.
Aqua ammonia	2 ounces.
Spirits of turpentine.....	2 ounces.
Tincture of iodine.....	1 ounce.
Corrosive sublimate.....	3 drams.
Fresh lard	1½ pounds.

Mix thoroughly together, and keep in a well-covered pot or can.

Apply this ointment all over the tumor, rubbing it in well with the hand. Let it remain on two days, then grease the part well with lard, every day, for four days. Then wash off with soapsuds and apply the ointment as before, and continue the same treatment until the cure is effected. During this time the horse should be kept in a cool, clean stable, and allowed cooling feed.

Some object to as strong treatment as the above, and insist that better effects follow a merely cooling and solvent treatment. With this view the persevering use of the following will be found valuable: Dissolve two ounces of muriate of ammonia in one quart of water, and then add four ounces of tincture of poison hemlock. A long roller, or bandage, is to be wrapped around the hough, so that several thicknesses of cloth will lie over the tumor. That part of the bandage cover-

ing the tumor is to be wet three or four times a day with the liquid.

Rest and light feed are required with this treatment.

SADDLE-GALL.

This is an inflamed tumor, resulting from the bruising of a bad saddle, at some point on the back. It is only such at first, but, if neglected and repeatedly bruised by the saddle, it may degenerate into a very troublesome sore.

Treatment.—Have the defect of the saddle remedied, or get a better one. If the tumor is just coming, bathe it well with cold water. Then place a bundle of Jamestown leaves under the saddle, on the tumor; and the horse may still be ridden, and it will get well. •

If the tumor has been neglected for some time, and is quite hard, but no matter formed in it, blister it, and repeat the blister every third day. If matter has formed, open it well, and use the ointment recommended for fistula and poll-evil, or any healing salve.

COLLAR-GALL.

This is the same character of sore as saddle-gall. If badly treated or neglected, it will leave a scar or lump easily irritated by the collar, and thus be the source of permanent mischief.

Treatment.—Rest and cold water, often applied, may reduce the inflammation at once, if it is just commencing; but the best plan is to put a rowel under it, below where the collar presses. This will draw the inflammation from the tumor. If matter has formed, proceed the same as recommended in saddle-gall. Indeed, the same course from the first would do well, even if roweling be added.

STRAINS, OR SPRAINS.

A STRAIN is a severe wrenching of the muscles, tendons, or ligaments of a part. Some of the fibers of the part may be lacerated or torn. Strains constitute an important class of the accidents of the horse. Strains of many parts deserve special consideration; as strain of the coffin-joint, of the back sinews, of the stifle, of the shoulder, of the back, of the hip-joint, of the knee, and of the pastern-joint.

SWEENY.

This is an affection of the muscles of the outer side of the shoulder. It is very common in the Western States. It is characterized by a shrinking of the shoulder, with lameness. It is atrophy, or wasting away, of the muscles.

Symptoms.—The symptoms of sweeny are easily detected. The first observed will generally be a slight lameness, particularly under the saddle or in harness. When this is observed, the horse will be found to stand with the foot of the affected side extended forward and a little outward, evidently for the purpose of resting the tired and sore muscles. On examining the shoulder, the muscles over the shoulder-blade will be found shrunk on the affected side, and on kneading, bruising, or pulling the skin of the shoulder, the horse will show signs of pain and tenderness. If there is any doubt of the case, by getting on the horse, and comparing the two shoulders, any difference in the size may be discovered.

Causes.—This difficulty results from strain of the muscles affected, causing them to waste or shrink away. It more frequently occurs in young horses, and in the spring of the year.

Treatment.—The object of the treatment is to remove that morbid or diseased condition of the muscles of the outside of the shoulder, which causes them to waste away or become atrophied. Use the following liniment:

Take—Oil of spike	2 ounces.
Oil of <i>origanum</i>	2 ounces.
Aqua ammonia	2 ounces.
Spirits of turpentine	2 ounces.
Sweet oil	2 ounces.
Alcohol	2 ounces.

Mix, to form a liniment.

This is to be applied freely to the shrunk parts, and well rubbed in, every other day. Four applications will cure it.

The disease may be cured either by a seton or rowels. If the seton is preferred, the seton-needle should be armed with a tape of sufficient length; the needle is passed through the skin at the upper border of the shrunk part, and passed down under the skin and out at the lower border. The tape is then drawn through, and the ends tacked or knotted together. The tape should be smeared with Venice turpentine, or fifteen or twenty drops of tincture of Spanish flies may be dropped into the upper opening. The seton should be turned and washed every day. In fifteen or twenty days the seton may be taken out, and the sweeny will be cured.

But I much prefer the use of rowels. Three will be sufficient—one put in above, one in the middle, and one below. The mode of preparing and inserting rowels, and attending to them, is described in the article on “Rowels,” which see.

STRAIN OF THE INSIDE MUSCLE OF THE SHOULDER.

This difficulty is of less frequent occurrence than strain of the outside muscles of the shoulder, but is a much more formidable ailment. The difficulty is in the great saw-muscle, which is the principal muscle in bearing the weight of the body, and connecting the forearm with the body.

Symptoms.—I can not give a better knowledge of this affection than by giving the history of a case which recently came under my observation. The subject was a large draught-horse, used in a team for switching railroad cars. He was a fine, mus-

cular, heavy horse, thirteen years old. In this case both the inside and outside muscles of the shoulder were affected, the outside presenting a true case of sweeny, or atrophy of the muscles, but which yielded to outward applications in a short time. The injury occurred in the following manner: The span of horses were hitched to a long rope which was attached to the cars, and the horses then, at a brisk pace, started up the grade, and when they reached the top, at which it was intended to leave the cars, the horses were turned off the track and left standing in a quartering direction. The cars came on, by the force acquired, up near to the horses, but, being still on the grade, instead of stopping, as intended by the driver, they started, and soon the whole force of their backward motion was thrown on the horses with great violence, and that in an oblique direction. One of the horses escaped without injury, but the other, the one in question, soon showed that he had been severely "jammed." I was called to see the case, and gave it as my opinion that not only the outer muscles of the shoulder were injured, but also the great saw-muscle, on the inner side, was badly strained. The symptoms of the outer injury, sweeny, were very clear, and I at once commenced the treatment of it, and proposed, also, to commence, at the same time, the proper measures for the relief of the other difficulty; but the owner of the horse, being rather chicken-hearted, would not submit to the measures proposed, as it required an operation slightly painful to the horse. The outside muscles soon returned to their proper size, and were in every respect well. But the horse still continued slightly lame, and, on being again put to work, became very lame. I was again applied to. I found no signs of sweeny in the outer muscles, though the horse stood with his foot forward, and in moving would bring it around in a circular motion, evidently to prevent the shoulder from coming close to the body. I proposed the same remedies as before, but the owner still objected. He then commenced trying every quack's nostrum, and after trying some ten or a

dozen, and losing nine months' time, he found his horse worse than at the commencement. He again applied to me, and agreed to submit to my treatment.

Treatment.—I first bled him about six quarts from the large vein (the plate-vein) in the forearm, and the next day gave a physic. I also inserted four rowels as near as possible to the seat of the injury; one in front of the shoulder-joint, just below the surface against which the collar presses, and another a little above the elbow-joint and to the inside of the arm, near the union of the arm with the body, and another behind the elbow-joint, and the fourth one about four inches above this, immediately behind the shoulder, at its union with the body. I kept these rowels running about twenty days, and then allowed them to heal. I kept him quiet, or allowed but little exercise, and ordered soft feed. After the rowels quit running, I ordered nothing further but rest for a few weeks. The lameness disappeared as the rowels healed, and, two months and a half after commencing the treatment of the case, the horse was being used in his ordinary work. It has now been over three years since he was treated, and he has not lost a day's work.

STRAIN OF THE STIFLE-JOINT.

The stifle-joint is composed of the union of the lower end of the upper thigh-bone with the head of the lower and larger thigh-bone and the patella, or knee-pan, forming the front part of the joint. This joint is a very strong and complicated one, and difficult to describe. It corresponds to the knee-joint of the human. This joint is sometimes dislocated, or put out of place, and occasionally strained; though it is very important to remark that strain of the stifle-joint is by no means so frequent as is generally supposed. This injury is sometimes called "*stifle*," or the horse is said to be "*stifled*." It is very common for the ignorant farrier, or the conceited pretender, to pronounce any lameness of the hind parts, which he does not

understand, "stifle," when, in fact, it is his judgment that is at fault.

Symptoms.—Strain of the stifle-joint is not, by any means, so clearly marked as might be supposed. There is very considerable lameness, the horse being scarcely able to touch the foot to the ground; he carries the leg along with difficulty, but brings his foot forward in the proper way, and places it right, but barely resting it on the toe, or, if the case is not very bad, resting it naturally, but not bearing any weight on it. The above is strain from twist or jerk. Heat, pain, and tenderness will be found on examination of the region of the stifle-joint by the hand. The patella (knee-pan) will be thrown out of place, either to the in or outside.

Causes.—Sliding on ice, the horse turning awkwardly when running, or any unnatural twisting of the limb, when the weight of the body is unnaturally resting on it. It is always the result of great violence.

Treatment.—Strain of the stifle-joint can be cured in shorter time by roweling than any other plan of treatment. One rowel put in just below and in front of the joint is generally all that is necessary. But, in a very bad case, two may be required, one on the inside and one on the outside of the joint, and about three inches apart. For the mode of making, inserting, and managing rowels, see the article on "Rowels and Roweling."

The part might be kept wet with a solution of tincture of arnica, until the inflammation is subdued, and then any remaining swelling treated by the application of the tincture of iodine, twice a day; the horse being kept quiet during the treatment.

STRAIN OF THE FETLOCK.

The fetlock-joint is made up of the union of the shank-bone, the two sesamoid bones, and the upper pastern-bone. It admits of backward and forward motion, and but very little

lateral or side motion. The injury we are considering consists in a strain of the capsular ligament of the joint, by the foot being forcibly thrown to one side, which is most likely to occur from the horse treading on a stone, or getting his foot fast in the mud, and bringing it out in a twist.

Symptoms.—Lameness of the foot affected is the most noticeable symptom of strain of the fetlock, but, as lameness occurs in many other injuries, it furnishes but little evidence of the locality of the difficulty. There will be found heat and tenderness, and perhaps swelling, at the point injured, and these, with the absence of the symptoms of other injuries, must be relied on in determining the case.

Treatment.—Soon after the strain occurs, or while there is active inflammation, known by the heat, swelling, pain, and soreness, apply a flannel bandage around the part affected, and keep it constantly wet with the following:

Take—Tincture of arnica.....1 to 4 ounces.

Cold water..... 1 quart.

Mix. Continue this treatment until the inflammation is all out of the part.

But if the case has been neglected for a number of days, apply a blister over the part most affected, but not so as to go clear around the leg. After the first is well, another may be applied at the other side. The blister may have to be applied several times over the affected part. The liquid blister may be used, being careful not to let it run on the heels, or the paste-blister will answer.

STRAIN OF THE BACK SINEWS.

This is an inflammation of the sheath of the tendons, or sinews, at the back of the cannon-bone, between the pastern and back of the knee. It is not correctly named, for the tendons are incapable of being sprained, as they are not elastic. The sheath in which these strong tendons work is composed of a dense, fibrous substance, and is moistened on

the inside with a mucous secretion to prevent friction of the tendons working in it.

There are two ways in which this sheath may be injured, causing inflammation in it. The first, called *slam* or *check*, is produced by the foot being brought down with great force on hard ground, in rapid movement, thus quickly extending the cords, which are relaxed when the foot is raised, causing injury of the sheath. The other way inflammation is produced in the sheath is by long continued overwork.

When inflammation takes place, an increased and altered secretion is thrown out within the sheath, around the tendon. This coagulates and becomes an organized structure, uniting the tendon with the wall of the sheath, which greatly interferes with the movement of the tendons, making it difficult and painful.

Symptoms.—This injury is very easily detected in a clean-limbed horse by the heat, swelling, and pain of the part on pressure, and the lameness, which will correspond with the degree of the inflammation and tenderness present. Sometimes the slightest movement will cause the most intense pain. In a horse with coarse, hairy limbs and thick skin, a little more care in examining the leg with the hand may be necessary to satisfy the practitioner, or observer, of the nature of the difficulty. When the case is a very bad one, it is sometimes called *breaking down*, but no importance need be attached to this name, as in but very few, even of such cases, are any of the fibers of the tendons or of the sheath broken. It may be remarked that round limbs are more likely to be injured than flat ones, as in the former the leverage is less than in the latter, and hence there is greater strain on them.

The hind-leg might be subject to a similar injury, but it has not so great weight to sustain, is not brought down with so great force, and, from the obliqueness of the limb, such sudden concussion is prevented.

Treatment.—If the case is seen while inflammation is present, known by the heat, swelling, and tenderness of the part,

wash the part with cold water, one quart, and tincture of arnica, two ounces, mixed. Then wrap the leg with a flannel bandage, and keep this wet with the solution of water and arnica. It will have to be wet every three or four hours. This is to be continued until the inflammation is reduced, or the patient cured. If the case is not seen until a chronic enlargement has taken place, or if any swelling remain after the inflammation is reduced, apply the liquid blister over the swelling at the back of the leg, but not around in front of it. Grease the heel with lard to prevent it from becoming blistered. If the first blister does not reduce the swelling, on the third day grease the part, and the next day wash with castile-soap; dry, and blister again.

RUPTURE OF THE SUSPENSORY LIGAMENTS.

The suspensory ligaments rise from the back part of the head of the shank-bone and the heads of the two splint-bones, and pass down between them to be inserted into the two sesamoid bones, which lie at the back of the pastern-joint. The ligaments are elastic, in which they differ from other ligaments, and which renders them very serviceable in assisting to prevent concussion, or jar. These ligaments are sometimes ruptured or broken, which leaves the two sesamoid bones at the back of the fetlock-joint without their proper support, and hence this joint falls much lower when the weight of the animal comes on it than it should.

Symptoms.—Rupture of the suspensory ligaments is very easily detected. The fetlock is let down so low that it nearly touches the ground, though the horse is still able to bend the joint; and this plainly indicates that it is not the tendon at the back of the leg that is ruptured. The early stage of the injury is, of course, attended with some inflammation in the point of injury, but which, after awhile, passes away, leaving a case of permanent lameness and unsoundness, which admits of no benefit from treatment.

GROGGINESS, OR KNUCKLING.

This is an affection about which there is considerable diversity of opinion. The shank-bone seems to project over the parts below it, so much so, in some cases, as to cause the animal to walk almost on his toes, and there is a peculiar tottering of the whole hind-leg. It generally occurs in old and overworked horses. Every joint of the foot has been referred to as the seat of this difficulty. It has also been attributed to ulcers in the joints, from the fact that these have been found on dissection of the feet of horses affected with it, but I think they have been a consequent or result, rather than a cause, of grogginess. I think the cause of the difficulty is the contraction of the ligaments and tendons at the back of the joints of the leg and foot.

Treatment.—Treatment can be of but little value in this difficulty, as the horse may be regarded quite worn out when it occurs. The repeated application of blisters to the parts just above the foot, is the only means likely to accomplish any good. First apply a blister on one side of the pastern, and after it is well, apply it to the other side, and then back to the first place again. By thus changing the place of the blister a number of times, some good may be effected. It must be borne in mind that, in no case, must a blister extend clear around the leg. The horse under treatment must not be worked.

DISLOCATION OF JOINTS.

THE joints of the horse are so firmly bound by ligaments, and so strongly grooved together, that they are seldom put out of place, or dislocated. But dislocations do sometimes occur, and many of them admit of successful treatment. But in

this country little attention has been given to their treatment, the horse generally being condemned to death on the occurrence of the accident, if at all serious. I am of the opinion much good will result from proper treatment of this class of injuries.

The treatment of dislocations consists in bringing the joint properly in place, in such manner as will keep it so until the injured muscles and ligaments have sufficiently regained their strength to keep it in place themselves, and to keep down injurious inflammation.

The particular dislocations necessary to consider are dislocations of the neck, shoulder, hip, stifle, and fetlock.

DISLOCATION OF THE NECK.

This accident may occur by the horse being pitched forward, or getting his head fast under the trough or manger. The head will be twisted to one side and fixed in that position. The muscles will be paralyzed, and a space can be felt on the convex, or prominent, side of the neck.

Treatment.—The feet should be so tied as to prevent the horse from rising or striking. Relax the muscles on the side of the neck to which the head is bent by fomentations of hot water, or bone-set, lobelia, etc., or bleed as much as the horse can stand from a large orifice, or opening, in the neck-vein. Then have the head pulled, or extended, and rotated, or turned, and at the same time the operator should press with one or both knees on the prominent part of the convex side of the neck. Persevere in these measures until the neck becomes straight. A broad band or splint, well padded, extending from the jaw back to the shoulder, is then to be bound to the side of the neck to which the head was turned, to hold it in place.

DISLOCATION OF THE SHOULDER.

This accident occurs at the shoulder-joint, or the joint where the collar presses. There is a dent, or depression, in

the shoulder, the elbow is fixed higher up on the side of the chest, and the foot is dragged along on the point of the toe. It can hardly be mistaken.

Treatment.—The operator stands in front of the horse, and, with both hands, grasps the lower end of the upper arm-bone at the elbow-joint, and places his head against the shoulder-joint. He then draws the lower end of the bone forward, pressing on the joint with his head. By this means the joint is brought in place, but much force is generally required. The most difficult part of the operation is to keep it in place. Put a collar on, with the seat resting squarely against the joint, and then put on the harness, and, with firm cords reaching from the rings of the hames to those of the harness at the thigh, keep a constant pressure on the joint. Keep the foot forward and the shoulder pressed back.

DISLOCATION OF THE HIP.

From the immense strength of the hip-joint it is rarely put out of place. In the horse, fracture of the haunch-bone at the socket of the hip-joint is more likely to occur than simple dislocation. But it may occur with fracture, or without it. The injury is a very serious one, and may be known by the hip being sensibly knocked down, or lower than the opposite one, and the lameness which it gives rise to.

Treatment.—To attempt to reduce this dislocation by any ordinary means would be useless. The best thing that can be done, perhaps, is to allow the animal a few months' quiet until a sort of provisional callous joint forms. I knew one animal, in which this accident occurred, cured by being suspended, or hanged up, by the legs, and considerably jolted while thus suspended. When let down, he walked off, with great ease, as if nothing had been the matter. This plan might be tried, using a block and tackle arrangement to raise the horse, when, by a sudden jolt, the joint will very likely be brought in place. This plan is on the same principle practiced by the

Sweets in setting bones. Their success has been very great in human practice. Tie both hind-legs together and both fore-legs together, run a pole between them, and hitch to the middle of the pole.

DISLOCATION OF THE STIFLE.

Dislocation of the stifle-bone, knee-cap, or patella, is an accident not near so often met as is generally supposed, other causes of lameness, or a mere strain of the stifle-joint, being mistaken for it. The stifle-bone may be either thrown to the inside or outside of the limb. When it is thrown outward there will be an empty or sunken space in front of the joint, and the stifle-bone will be felt firmly fixed at the outer side of the joint. The limb is stiffened and extended backward, and the horse can not bring it forward. When the stifle-bone is knocked inward, a similar space will be found in front, but the bone will rest on the inside of the joint. The limb will be drawn upward and outward, and the horse will be unable to rest on it.

Treatment.—The limb is to be drawn upward and forward. A rope may be fastened about the pastern, and if the dislocation is inward, carry the rope between the forward legs and to the opposite side from the injury, and then over the neck. The necessary amount of force may be then applied to the rope to draw the limb sufficiently upward and forward. The operator then replaces the stifle-bone, and holds it there until the limb is carefully let down, and for a few minutes afterward. When the bone is thrown outward, pass the rope over the neck to the opposite side, and then proceed as in the other case.

DISLOCATION OF THE FETLOCK.

The fetlock, or upper pastern-joint, may be dislocated, the foot being turned either outward or inward. The deformity is such that this accident can not be mistaken.

Treatment.—Force enough to bring the joint properly in place must be used. Take two splints made of a flat iron bar, one-fourth of an inch thick, reaching from the border of the shoe half-way up the leg, or a little more. The splint is to be made to fit the side of the leg, and bent so as to correspond to the angle at the joint. The lower end of the splint is to be made thin and turned inward so as to be driven between the shoe and hoof, to keep it in place. The splints are then to be wrapped with muslin to prevent them from hurting the skin. They are then applied, one on each side, the lower turn being driven under the shoe, and a stout roller, or bandage, carried from the pastern-joint up to the top of the splints, binding them firmly to the leg. Keep wet, until the swelling goes down, with a solution of tincture of arnica.

WOUNDS.

A WOUND is the cutting or rending asunder the soft parts, by mechanical means. Wounds are named, from the condition in which the parts are left, or the manner in which the wound is inflicted, incised, contused, lacerated, punctured, or penetrated. In man many wounds heal without the formation of matter, or pus, the parts uniting by simply being brought together and kept so for a short time. This is called healing by "first intention." But this mode of healing is, by no means, so common in wounds in the horse's flesh. Here we generally have to wait for matter to form and new flesh to fill up the rent. The reasons for this are, that the horse has a muscular coat spread all over his body, under the skin, which he uses to shake off flies or any thing else that annoys his skin. By this the sutures, or stitches, are often torn out, and the wound is left gaping. The horse, also, often rubs the part or breaks the sutures with his

mouth. It is impossible to guard against these accidents perfectly.

The principles on which wounds are to be treated are quite simple. If the wound is recent, that is, has been inflicted but a short time, or if there is not much bruising of the edges, after any hair, dirt, or splinters have been removed, the edges should be brought together by sutures, or stitches, and an effort made to effect a union by first intention, or without the formation of matter. The stitches should be close enough to bring the edges of the wound together all along. In sewing up a wound, a flat curved needle and silk cord, or saddler's silk of large size, are used. The needle being armed, or threaded, should be passed through the skin of both lips of the wound, and the thread drawn through and tied by a *surgeon's knot*. This knot is made by passing one arm of the thread over the other twice, and then drawing the knot. This knot will not slip. The thread is then cut off, and another suture is made in the same way. The only dressing necessary, after the wound is sewed up, is for it to be bathed with compound tincture of myrrh, or tincture of camphor occasionally, if there is any swelling or heat present, or, what is best for all wounds, a strong tincture of garden marigolds. A bottle should be filled with the flowers, and diluted alcohol, to fill it up, added, and let stand two weeks, or apply tincture of arnica around the cut, but not into it—one ounce to a quart of cold water.

INCISED WOUNDS.

These are such as are inflicted by a cutting instrument. An incised wound may properly be defined to be "*a clean cut.*" It, of course, may be but a very trifling cut, requiring no attention whatever, or it may be of great length and depth, presenting a most ghastly sight, and, from the amount of bleeding, seriously threaten the horse's life.

Treatment.—If any artery is cut and bleeding, it must be

taken up and tied. (See "Wounds of Arteries.") The cut must then be cleansed of any dirt that is in it, and if any part of the instrument making the wound remains in it, it must be found and taken out. The next step is to bring the edges, or lips, of the wound together, and keep them so by a proper number of sutures, or stitches. If any inflammation or swelling and heat arise, or to prevent them from taking place, the part may be bathed often with compound tincture of myrrh, tincture of camphor, or tincture of marigolds. If the stitches should rot out or get broken, the wound will have to be healed by the formation of matter, or, as it is called, by *granulation*.

CONTUSED WOUNDS.

These are inflicted by blunt instruments, and are generally irregular in their shape, with bruising of the lips, or edges, of the wound. Snagging is the most common way in which these wounds are inflicted in this country. A contused wound may be very extensive, and often a great pocket in the flesh is formed.

Treatment.—These wounds can not be healed by first intention; they heal by the formation of matter and the filling up of the rent by new flesh. This process of healing is called "*healing by granulation*." Cleanse the wound from dirt or splinters, bring the lips of the wound as near together as possible, by a few stitches taken far back in the skin, being careful to leave a sufficient opening for the matter to run out. If in a place where it can be done, the part may be supported by a bandage, and the wound held together. Inflammation must be kept down by the constant application of cold water, or it may be dressed with compound tincture of myrrh, tincture of marigold, camphor, or opium. If the wound becomes very offensive, charcoal may be applied to it, or solution of chloride of lime; or it may be washed out with pyroligneous acid. If maggots get in the sore, the above lime or acid will destroy them, or turpentine will effectually get them out. The matter in these wounds has a great tendency to burrow along the muscles, forming great

pouches. Where these form they should be freely opened at the lower part of the pouch, or sack, and the matter let out.

LACERATED WOUNDS.

A lacerated wound is only an irregular cut, or rent, often presenting a flap of skin or flesh turned back.

Treatment.—The treatment of lacerated wounds should be the same as that recommended for incised wounds. But if the stitches should break, the lips of the wound are to be kept as close together as possible, and healing by granulation favored by the means recommended for contused wounds.

PUNCTURED WOUNDS.

These are made by sharp instruments, such as nails, the prongs of forks, splinters, etc. A punctured wound may be of very great depth, or very shallow. Its dangerousness will depend much on the part in which it is made. Very high inflammation is likely to occur in a severe punctured wound. Lock-jaw is one of the common dangers of this sort of wound. This sort of wound generally heals by forming matter, or by suppuration, which is the most favorable and safe method.

Treatment.—The first thing to be done is to ascertain if there is any thing in the wound. This is done by probing, and, where it can be used, the best and most satisfactory probe is the finger. If any thing is found, *it must be taken out*. To do this it may be necessary to open the wound much wider with a long-bladed knife, being careful to make the cut in the direction of the muscles, so as not to cut arteries. This being done, if the wound is in the fleshy part, the object is to prevent too high inflammation and get matter to forming as soon as possible. Take a small wire, and bend it double, and then wrap it with tow, hemp, or flax-lint, and moisten this tent with Venice turpentine and introduce it, the bent end forward, into the wound. The tent should be long enough to reach near the bottom of

the wound. The tent is best held in by taking a stitch in the lip of the wound and through the tow or flax at the outer end of the tent. After the inflammation has gone down and healthy white matter appears, this long tent may be removed and a shorter one introduced, so as to let the bottom of the wound heal; and, after a few days, a still shorter one. The object is to heal the sore from the bottom toward the outside. The outer opening must not be allowed to close until the wound is healed below. At the same time the tent is being used in the wound, the part may be bathed with tincture of arnica, marigold, or compound tincture of myrrh.

If the punctured wound reaches to the bone, and it is sloughing, which may be known by the peculiar offensive smell, and the matter being grainy, in addition to the wound being kept open, it may be injected once a day with the following: Tincture of iodine, one part; water, four parts, mixed; of this inject enough to fill the wound; or pyroligneous acid may be used for the same purpose.

In this sort of wound, as well as others, if there is any disposition for the matter to form a pouch, which there generally is if the wound has a downward direction, it should be opened early, below, so that the matter may pass out.

Punctured wounds of the foot deserve especial consideration. They are made by nails in shoeing, or by the horse treading on a nail, snag, or other sharp thing. Here it is of the first importance that every part of the instrument causing the wound should be removed; for, generally, if any part of it remains, it will entirely close the wound, and the matter which forms can have no chance to escape, only by forcing a way through the soft parts injured, thus forming a quittor. A puncture of the foot may only pass through the hoof and slightly injure the sensitive or fleshy parts in it; or it may even lacerate those parts badly, or injure the bones within the hoof, or their ligaments or joints. If the puncture is caused by a nail or any other agent, and it is certain no part is left in, and that the wound is

but slight, rest may be all that is necessary. But in this case the foot should be closely watched, and on the first appearance of lameness or tenderness, the sole should be pared away down to the quick about the puncture, so that any matter formed, or that may form, will find a ready passage out. This course is to be pursued in all severe cases of puncture. The hole, or excavation, thus formed in the sole is to be plugged with a pledget, or plug of tow, wet with Venice turpentine, and a bunch of tow laid over the sole. A piece of leather is then fitted to the bottom of the foot, and held in place by a thin piece of wood, each end of which is thinned so as to wedge in between the shoe and crust. The tow is to be removed once a day and a new plug applied. If swelling or heat occur in the foot or pasterns, a solution of tincture of arnica, one ounce to a quart of cold water, may be applied, keeping the part wet with it.

If the sole becomes separated from the sensitive sole, the dead part should be pared off, leaving the sensitive sole uncovered. The exposed part should then be touched with nitrate of silver, and covered up with fine tow or lint, and the leather sole put on. It should be dressed every day, but it will not be necessary to use the nitrate of silver any more, unless fungus, or proud-flesh, should be sprouting up, which should be freely touched every day until it is removed. New horn will soon be found forming, to replace that removed. If quittor should be found to have formed before treatment is commenced, treat for that disease. It is astonishing how readily the most extensive suppuration within the foot will subside when a proper opening is made in the sole of the foot, and it is properly protected from dirt getting into it.

PENETRATING WOUNDS.

Penetrating wounds are such as enter some of the internal cavities, and they may be complicated with wounds of the internal organs. They are, of course, unfavorable, but not necessarily fatal.

Penetrating wounds of the belly may be very slight, or large enough for portions of the bowels to hang out. We should not despair of even such a case. Treatment may be successful. If there is dirt on the protruded bowels or lips of the wound, wash it off. Then endeavor to get the guts back. But if this can not be done, put a broad bandage around the horse to support the guts, and cast, or throw, the patient. Have plenty of hay or straw for him to fall on, and be sure that he falls on the opposite side from the injury. The guts must then be put back, if it is even necessary to enlarge the opening. Then proceed to sew up the wound. The internal lining of the belly is to be brought together first. Have a proper curved needle threaded with surgeon's or saddler's silk. Commence at one end of the rent or opening, and pass the needle through the two edges of the peritoneum, or under lining of the belly, draw the thread until within about six inches of the end, and cut it off, leaving both ends of the thread the same length. Do not tie it, but pass another thread the same way, about half an inch from the first, and cut it off the same way, and so on until the necessary number of sutures are provided for. Then tie them with a surgeon's knot. If the stitches are tied as the thread is introduced, the last stitches can hardly be taken. The next thing is to sew up the outer wound. This is done the same way that a simple cut is sewed up. One arm of the thread of each of the sutures in the peritoneum should be left hanging out. The other may be cut off tolerably close to the knot. A broad bandage should be applied around the belly, and the part may be kept wet with solution of tincture of marigolds or cold water, to keep down inflammation. It may be practicable, in some cases, to put the guts back and sew up the wound without casting the horse. The diet should be very cooling and light—scalded shorts, in moderate quantity. If a gut should be cut, it should be sewed up nicely with fine silk before being returned. If inflammation should run high, bleed to the extent of reducing the pulse to thirty-six or forty.

Penetrating wounds of the chest may enter the lungs. All that can be done is to sew up the wound, not very close, pass a bandage tight around the chest, and apply local applications to keep down inflammation. If inflammation runs too high, bleed freely. Use scalded shorts, and keep the horse quiet.

GUNSHOT WOUNDS.

These are not very common in horses, except in battle. They may be very slight, or very extensive. If it is thought necessary to try to save the horse, any piece of shell or ball remaining must be removed, if it can be reached. To do this, extensive cutting may be necessary. The wound is to be healed by suppuration. This soon takes place. It may be necessary to keep the wound open by the lint described under the head of "Punctured Wounds," to keep the outside from healing too soon. If it becomes offensive, charcoal may be applied, or a solution of chloride of lime may be injected into the part, or pyroligneous acid.

WOUNDS OF ARTERIES.

Sometimes, by accident, or in performing surgical operations, important arteries are wounded, and the horse's life is threatened from the loss of blood. There are several methods which may be successful in stopping the blood. If the artery is quite small, its mouth may be caught by the fingers or a pair of tweezers, and pinched and twisted; or the direction from which the artery comes may be found, and if it lies near a bone, and not deep, it may be pressed on by the thumb or the handle of a key, to stop its bleeding. Styptics may be used. Among those at hand may be mentioned the flesh of sole-leather, common cobwebs, puff-ball, and powdered alum rolled in cotton. A handful of any of these may be stuffed into the wound, and firmly bound there. They will generally be successful, but if they fail, or if the artery is

large, lose no time in getting hold of the bleeding end of the artery with a pair of close-jawed forceps, tweezers, or pinchers, and then, drawing it out a little, pass a cord around it, and tie it with what is called a surgeon's knot, that is, pass the one arm of the cord twice over the other before drawing the first knot.

It may be impossible to get hold of the bleeding end of the artery, and then the artery may be reached by cutting down to it a short distance from the wound. When it is reached, a blunt hook is passed under it, and then the cord may be passed around it and tied, or an eye may be turned on the end of a wire, and then bent into a hook, the eye being armed with a cord so as to pass it around the artery.

Bleeding from veins can nearly always be stopped by using the styptics before named.

The blood from an artery is a bright, florid color, and flows in jets or spurts. That from a vein is of a dark color, and flows in an even stream.

BROKEN KNEE.

A reference to the structure of the knee will be necessary before explaining this injury. The knee-joint is formed by the union of no less than ten bones, viz.: the lower head or end of the arm-bone, the upper row of knee-bones, (three in number), arranged from side to side, the lower row of knee-bones, (also three, and similarly arranged), and the heads of the three leg or shank-bones. Wherever bones are united for the purpose of forming a movable joint, and sustaining weight or pressure, the parts of the bones which oppose each other are covered with a thick, elastic (springy) substance called cartilage, and this cartilage also is covered by a tough membrane, having its free side of a glassy smoothness, and which lies in contact with the same membrane covering the opposite bone and cartilage. This membrane is a shut sack, and may be compared to the skin of the egg, after the shell is peeled off, and supposing the

white and yolk to be removed without breaking the skin. Let this skin now be placed in a hollowed cavity in the end of one stick, and the rounded end of another placed on it, and you will be enabled to perfectly understand the arrangement of this membrane in a movable joint. This membrane is called the *synovial membrane*; and its smooth surface constantly secretes a fluid for the purpose of keeping the joint free, as if it were oiled. This fluid is called *synovia*, joint-water, or joint-oil, and its presence is absolutely indispensable to the health and free motion of the joint. These bones, forming the knee-joint, are all firmly bound together and held in their places by strong ligaments and bands, so arranged as to permit a free backward and forward motion, but no other, and also forming a complete covering of the whole joint to guard it against injury from outward violence.

To guard against concussion or jar, it will be seen that there are, in the knee-joint, six layers of thick, elastic cartilage, six layers of synovial membrane, and two layers of synovial fluid, or joint-oil. Were it not for this admirable provision of nature, the concussion, even in an ordinary gait, would be so great as to do irreparable mischief; and who could tell the result to the hunter, who comes down with a force equal to several thousand pounds weight in leaping a fence or a ditch?

Broken knee is generally produced by the horse falling, for when he falls the knee is thrown forward, and the whole force of the body comes on it, and if it comes in contact with a stone or any hard substance, or even the hard ground, injury of greater or less extent is very likely to be the result. The knee may be cut by a kick or by being struck against any sharp-edged substance.

However the injury may occur, it is one of more than ordinary importance. The cut may only be through the skin, or down to the ligaments covering the knee-joints, or it may pass through these ligaments to the bones of the knee, or even into the cavity of the knee-joint, opening the joint and letting out

the joint-oil. The last is the most serious form of the injury. If the hole into the synovial sack be small, and where the motion of the knee is not considerable, as at the union of the lower row of knee-bones with those of the shank, considerable hope of a cure may be entertained. If small and high up, opposite the upper row, it may be cured; but if opposite the union of the two rows of knee-bones, the case may be looked upon as of an extremely unfavorable character, and very certainly so if the opening be large.

The mischief results from the synovia, or joint-oil, escaping, and allowing the surfaces of those delicate membranes to come in contact with each other, which excites inflammation in them. This inflammation is of the severest character, nothing equaling its painfulness. A high degree of sympathetic fever supervenes, the inflammation becomes worse and worse, and the fever increases, and the horse is destroyed. Or, if he does not die, the joint fills up with bony matter, rendering it perfectly stiff, or, as it is termed, *anchylosed*.

Treatment.—Clean the cut and carefully examine it with a probe, to ascertain if the joint is really opened. If it is found not to be open, the wound is to be treated much the same as an ordinary contused or bruised wound. To reduce inflammation and prevent proud-flesh from sprouting up too much, apply a poultice of ground flax-seed, with a little burnt alum dusted over it. But if the joint is opened, and the joint-oil is flowing out, the case is a most serious one, and may baffle any treatment. The object to be attained is to close the wound for the purpose of preventing the escape of the synovia, or joint-oil.

The only plan of treatment which offers any probability of success is the application of the hot iron to the wound, and particularly to the opening into the joint. The swelling which follows the application of the iron is so great as to close the wound. After the burning, a poultice may be applied, and the case treated as an ordinary wound, but should the joint-oil

continue to escape, it will be seen on removing the poultice, and the hot iron should be again applied.

If the flow of the joint-oil can not be stopped, a high degree of inflammation is set up in the joint, the horse suffers indescribable pain, and hectic fever sets in. The case is then hopeless; and the horse would better be shot.

If the opening into the joint is so large as to offer no prospect of cure, if the patient is a brood-mare or stallion, amputation of the leg, some distance above the knee, may save life, and leave the animal quite useful.

CONCUSSION OF THE BRAIN.

This is a stupefying, or apparent knocking dead, of the horse, from a blow on the head. After awhile sensibility returns, but the animal is evidently not "*right in his head.*" After the horse has got up, he will walk staggeringly, hang the head, and be insensible to what is around him. His breathing will be difficult and oppressed, and after some time the pulse may be increased. The fact of the lick on the head, and the horse not being right after it, will be pretty good evidence of the trouble. The pupil of the eye will be enlarged, or dilated.

Treatment.—While the horse is yet down, and apparently dead, hartshorn (aqua ammonia) or tincture of camphor may be applied to the nose, or a bucket of cold water dashed on the head, for the purpose of arousing him. The place where the blow was received should be examined to see if the skull is fractured, and if any piece of bone is driven in and pressing on the brain. If there is fracture, open the skin to the bone, by two cuts, running one across the other, and take out the broken pieces and stitch up the wound. After the horse has got up, keep a bandage around his head, wet with cold water or solution of tincture of arnica. If the pulse rise, or any other symptoms of inflammation appear, give the horse

one dram of tincture of arnica every twelve hours, and an occasional cooling physic—the following:

Take—Aloes, pulverized..... 6 drams.

May-apple root, pulverized..... 2 drams.

Cream of tartar..... 4 drams.

Mix, and give in a quart of warm water.

OPERATIONS.

BLEEDING.

THE operation of bleeding is very simple. It consists in compressing a vein so as to dam up the blood on its way to the heart, and then, with an instrument called a lancet or fleam, opening the vein, and allowing the desired quantity of blood to flow. The vein generally selected for bleeding is the jugular; the point most convenient is about three inches back from where the vein divides. The vein may be compressed by tying a cord around the neck some distance back of the place for bleeding, or the necessary pressure may be made on the vein by the finger of the operator. The left or near side being selected for the operation, the operator places himself by the near shoulder of the horse, with his fleam in the left hand and the blood-stick in the right; he then moistens the hair along the course of the vein. The horse's head is then turned a little to the right, by the person holding him, and his left eye blinded by holding a hat or the hand over it. Then, the fleam being placed at the proper point, the operator raises the stick and strikes the fleam sharply, by an overhand blow. An assistant holds a vessel, resting against the neck, so as to catch the blood, which should be allowed to strike fairly in the bottom of the vessel.

A fleam with a broad blade should generally be used, for the same quantity of blood taken from a wide opening will do much more good than if taken from a narrow or small one. The quicker the blood is taken, the better will be the effect.

After the necessary quantity of blood has been taken, the pressure is to be removed from the vein, and a small, sharp pin passed through the edges of the wound, and a little tow or a few hairs from the mane wound round it. The horse's head should be so tied as not to permit him to rub the wound. In twenty-four hours the pin should be removed. If the bleeding is to be repeated in three or four hours, a new place should be opened, and not the old wound, as is sometimes done.

Much may be told by the appearance of the blood drawn as to the effect produced; but the most reliable method of determining what has been accomplished is by noting the effect on the pulse. Every person should familiarize himself with the pulse, and then he will be able to bleed intelligently. This is, really, the only reliable guide.

There are other veins which are sometimes selected for bleeding. The plate-vein, which runs up on the inside of the fore-leg, from behind the knee, is sometimes selected. The point at which it is opened is near where the arm joins the chest.

The large vein on the inside of the thigh, called the *saphæna*, or thigh-vein, is sometimes opened. It is recommended to bleed from it in water-farcy.

The toe-vein is often selected for bleeding. The toe-vein, so called, is only a dense net-work of small veins. It is reached by cutting a small groove with the point of a fine drawing-knife, called a searcher, through the sole at the toe just where it unites with the crust. As the point of the searcher reaches the vein, a sufficient opening is made for the blood to flow. The bleeding may be encouraged, by placing the foot in warm water. The bleeding may be stopped by plugging the groove with a little tow, and then nailing on the shoe. Bleeding

from the toe is practiced in inflammation of the foot and severe strains and bruises about the feet.

I have only spoken of the fleam as the instrument for bleeding from superficial veins. A large spring lancet may be used, and there is probably less danger of cutting through the opposite wall of the vein with it than with the fleam. It would, perhaps, be better for the inexperienced bleeder to use the spring lancet; but the best instrument, in an expert hand, is a good thumb lancet.

I have said nothing about bleeding from the bars of the mouth. I would recommend this in no case. It has no advantage in any case, but many disadvantages and dangers. If the cut is small enough blood to produce any good effect can not be drawn, and if the cut is large, fatal bleeding may be the result. There is great danger of wounding the arteries of the mouth, and then the bleeding becomes extremely difficult to stop. If the bars have been cut and the bleeding does not stop, a sponge or cloth, wet with cold water, may first be tried. If this fail, a pledget of tow or a roll of muslin may be fastened on the middle of a long strip of muslin, about two and a half inches wide, and then placed on the bleeding vessels, and bound firmly there, by bringing the strips across the nose, and then through the throat-latch of the bridle, and then back over the nose, and tie. By this means a sufficient pressure is made to stop the blood.

Many persons entertain a strong prejudice against bleeding; and this prejudice is shared by some authors for whose opinions I have very great respect; but in this matter I must differ with them, and give my reasons for so doing. I shall then endeavor to answer the objections that are urged against bleeding, and it will be remembered that I am arguing with veterinary surgeons, and not with human doctors. The arguments in favor of bleeding, in those diseases for which it is recommended, are founded on the known and universally admitted effects it has on the system, and on the experience

of the ablest veterinary surgeons in the profession. First, it is known that a horse of ordinary strength will bear the loss of several quarts of blood, when in a state of health, without any apparent injury to his strength, ability to endure labor, or his health in any particular. This we learn from the habit, in some parts, of bleeding the horses at certain periods, with a view of improving their condition. Men of the closest observation, though they regard the habit useless, have not found such horses injured by it. Hence, we infer that the horse may suffer the loss of blood with comparative impunity. Now, why is this? It is because the horse is naturally a full-blooded or plethoric animal, with powerful lungs, powerful digestion, and of great powers of endurance, and because the reparative powers of his system are very active. His system may endure a temporary drain, or loss of the vital fluid, but, from his full habit, it will very soon be restored. Second, it is an established fact that acute inflammation will invariably yield immediately to bleeding; and it is equally true that it will not return again in a large proportion of cases, after the first bleeding, if nothing else is done. In every case, in the early stage of disease, it procures at least a temporary arrest of the inflammation, and gives time for the use of other remedies to prevent its return. It also reduces the proportion of those elements of the blood which favor the progress of inflammation. It thus, as it were, cuts off the fuel from the flame. It draws off the undue quantity of blood from the congested vessels of the inflamed organ, and gives them an opportunity to contract to their proper size. It removes the irritable state of the heart and arteries of the system, and equalizes the circulation of the blood. This is shown by the pulse becoming soft and natural, and the warmth of the extremities returning, in such a case as pleurisy, while the blood is being taken. Now, while I contend that these effects are most desirable, I regard it of equal

importance to make use of such measures as will preserve these good results.

Now, if these results are desirable, there is certainly great advantage in bringing them about by bleeding, for the one powerful reason that they are accomplished in a few minutes, whereas they can not be brought about by any other means short of several hours.

Many object to bleeding, in acute inflammatory diseases of the horse, from the fact that general bleeding is not much practiced at this day by human doctors. And this is, perhaps, the principal foundation of the prejudice against it in the horse. But there is a great difference in the circumstances of a case occurring in man and a horse. In man, the duration of most inflammatory diseases is several days, and there is abundant time for medicines to act before the disease reaches the point of danger. In the horse, such diseases run their course much more rapidly, the case often progressing beyond the reach of remedies in a few hours. In man, the effect of medicines can be obtained in from one to three hours, while in the horse the time required is much longer. Hence, though we may safely await the action of medicines in the human patient, we can not in the horse. His disease progresses much more rapidly, and it takes longer time for medicines to act.

It is urged by some that injury is done the horse by bleeding, by reducing the proportion of red globules in the blood. This is, no doubt, true of the human patient whose blood is already below the standard of health, but all experience shows that men of full habit, and rich in blood, may be safely bled. Now, as the horse, as we have before seen, is of plethoric habit, we would expect him to bear bleeding without injury; and it is very rare, indeed, that any real injury follows judicious bleeding; but hundreds of horses are lost by fooling away time to subdue inflammation by the use of means requiring many hours for their action on the system.

If the evils complained of did actually follow bleeding, even then, considering the immediate good it accomplishes, it would yet be good practice to resort to it.

But it is said that we ought to discard bleeding, because dropsy of the chest and general dropsy have been produced by excessive bleeding. I admit it to be the fact that they may be so brought on. But in an experience of over thirty years no such case has occurred in my practice. I think such is the experience of good veterinary surgeons generally.

It is objected that the practice is barbarous. If it is the safest, as it certainly is the quickest, method of relieving the animal from the pain and danger of inflammation, I can not see wherein it is barbarous. Such an objection to a remedy attended with so little pain to the animal, and which every person knows gives present relief, at least, from the pain of the disease, seems too ridiculous to be urged by a sensible man.

Bleeding has this advantage, that it is a remedy that can always be resorted to in a few minutes from the time the horse is taken. By the directions given, the operation can be performed by any one, whereas one or more hours have to be lost in going to the drug-store, often many miles off. By bleeding, the disease can, at least, be held in abeyance until other necessary remedies can be obtained. This saving of time very often proves to be the saving of the horse's life. It is a simple remedy, and often breaks up a disease at once, and may save the expense of employing a veterinary surgeon and of more costly medicines. I have no personal interest in the world in recommending men to bleed their horses in any disease. I have no delight in seeing blood flow, nor even in seeing man or animal compelled to swallow offensive drugs, but I solemnly believe that the proper use of bleeding is one of the most valuable means within our power of subduing inflammation in the horse.

Though we are not willing to entirely condemn bleeding, we do not fail to use, in conjunction with it, those other but

slower remedies, which some are disposed to rely on entirely, such as nauseants, diaphoretics, etc.

NICKING.

This operation consists in dividing or cutting the muscles whose office it is to draw down or depress the tail. The object of the operation is to cause the horse to carry his tail in a raised position. An angle of elevation of about forty-five degrees is generally aimed at.

We are not sure that good taste, Christianity, and humanity, are not all violated in thus mutilating the horse. We are sure his comfort is much diminished.

The instruments necessary to perform the operation of nicking are, a nicking-knife, or a narrow-bladed knife, rounded on the edge from the heel to within half an inch from the point; the pulleys, which are to be arranged in the horse's stall; a twitch for the nose and a collar around the neck, to which two ropes are tied, and one of these extended back to the pastern of each hind-leg. The horse being thus manacled, an assistant holds the head and another the tail. The operator then passes the knife through the skin at the side of the tail, as near the root of the tail as possible, so that the back of the knife rests against the lower side of the tail-bone. The knife having been introduced far enough to pass the muscles of that side, by a sawing motion of the knife the muscles are cut, which may be known by the edge of the knife reaching the skin. The muscles of the other side of the tail are then to be cut in the same way.

The same operation is then performed about an inch and a half or two inches back on the tail, and then again about the same distance from that place, so that the under muscles of the tail are cut three times. Only two cuts are sometimes made. The horse is then ready for the pulleys. The tail will have to be kept raised by the pulleys three weeks or a month. He should

be taken out a little time every four or five days. Light feed should be given. The best pulley is to be put on a collar. Make a tail-set of light wood, and place it on the rump, with a groove for the tail and a pulley to the collar.

DOCKING.

Docking, or amputation of the tail, should be performed in the following manner: The horse is cast; the place it is desired to take the tail off is selected, a joint is found, and about half an inch below it, by one sweep of the knife, the skin of the tail is cut; the skin is then forcibly drawn back until the joint is in view; the knife is then passed squarely through the joint, and the tail is off. There are two arteries which may have to be tied. The forceps and silk should be on hand for this purpose; or they may be seared with a hot iron, to stop the bleeding. The skin is then drawn down over the end of the bone, and two or three stitches passed through it to close the wound. Cold-water dressing, or a little tincture of aloes and myrrh, is all that will be needed.

NERVING.

This operation consists in cutting in two the *plantar nerves*, or nerves of the foot, or first cutting them and then cutting a piece off of one of the cut ends. The nerve at each side of the pastern is to be operated on. To perform the operation requires a correct knowledge of the anatomy of the foot and pastern. The horse is cast, or thrown, and the foot to be operated on firmly secured; or chloroform may be given the horse, when an assistant can hold the foot. If it is the left foot that is to be operated on, first have the horse thrown on the right side. Then clip off the hair to the outer side of the pastern-joint, and by careful examination the situation of the artery and its course can be ascertained. Then, starting a little behind the artery, and about an inch below the fetlock-

joint, make an incision through the skin, about an inch and a half in length, following the course of the artery. The white or cellular tissue covering the vessels and nerve may then be carefully dissected back, or cut through, until the nerve, which lies close to the artery, can be seen. It will be known by its whiteness. A curved needle, threaded, is then passed under it, and drawn through until the nerve can be raised by the thread. A knife is then passed under it, and it is cut in two. The lower end of the nerve is then caught with a pair of forceps, and about three-fourths of an inch cut off. The wound is then closed by sutures, (stitches), and a light bandage put round the limb, and kept wet with water. The horse should then be turned and the other side of the limb operated on. If the operation is to be performed on both feet, first operate on the inside of the lower foot, and then on the outside of the upper one. Then turn the horse, and operate on the other sides of the feet. Then keep the horse tied up until well, and on a soft dirt floor. Any person with some skill may perform this operation, but it would be best to find a dead animal and operate on it first, to learn the practical part.

The effect of this operation is to destroy the sensibility or feeling of the foot. By this means a disease of the foot which caused the horse much pain and lameness is entirely unnoticed by him; for feeling is destroyed in the foot, and he walks on it as if nothing were the matter. It is as dumb as a wooden leg. A horse that was utterly useless, on account of lameness, may be restored to considerable service by this operation. It does not cure the disease; it only renders the horse insensible of its existence.

The operation is not to be performed during the acute or inflammatory stage of any disease of the foot. Inflammation should be entirely removed before operating. Accidents may attend this operation, rendering it of no avail, and even destroying the horse more than the disease would have done. Nor is a horse so safe and sure-footed after it as a sound horse.

He is also very liable to batter his feet badly, for he has no idea of taking care of them.

Nerving, or neurotomy, is generally performed for incurable lameness of the feet. The following diseases furnish subjects for this operation: Ring-bone, disease of the coffin-joint, contraction, inflammation of the lamellæ, bony cartilages, etc. Always remember not to operate while inflammation is present.

CASTRATION.

This operation has been performed on the horse from the earliest periods of his domestication. It is performed for the purpose of enhancing the usefulness of the male by subduing his spirit and rendering him mild and docile as the female. While it accomplishes this object, it has a great effect on the future development of his frame. It produces a finer development of the neck, and head, and shoulders, and renders the whole frame more like that of the female. Immemorial custom has sanctioned this operation. The questions, then, to be considered are, at what age should the operation be performed, and how should it be performed? In deciding the former, the safety of the colt, the purpose for which he is intended, and the degree to which it is desired to preserve the stallion form, are to be considered. Facility, success, and safety are to be considered in determining the method of operating. The younger the colt, when operated on, the lighter will he be in the forehand. For most purposes, and among our cold-blooded horses, the age of one year will generally be best for the operation, all circumstances considered. For heavy draught-horses, where a heavy forehand is desirable, the operation may be deferred to two and a half or three years. For the carriage-horse, the age of two years will secure the most favorable development. For the saddle, greater care should be exercised. From one to two years, according to the form and spirit of the colt, will give the desired result. No

colt intended to be castrated should ever be allowed to cover a mare.

There are several different modes of performing the operation of castration. That which is, perhaps, most in use in this country is the French method. For its performance are necessary a pair of hobbles, so constructed as to cast the horse or colt, and secure the hind-legs firmly forward, a scalpel, or sharp knife, some waxed thread, and a pair of clams. The clams are best made of a piece of dry elder, from five to six inches in length. They are split open and the pith removed, and one end of each piece beveled off for about half an inch. A notch, or groove, is cut around them. The place occupied by the pith is then filled with a thick paste made of flour and mixed with corrosive sublimate. The two pieces are then placed together, and a waxed cord tied around the beveled end, so as to form a sort of hinge. The clam thus prepared is ready for use.

The subject is cast, and his hind-legs well secured forward. The operator then places himself so as to grasp the testicle in his left hand, the knife being in the right, and by a gentle sweep of the knife backward, cuts through the scrotum, or bag, when the testicle, covered by the muscle called the cremaster, and the tunica vaginalis, will be exposed. By a very gentle sweep of the knife, these are next divided, and the testicle entirely uncovered, is in view. Or, all may be done by the first sweep of the knife. The clam is then placed well up on the cord, above the epididymus, or smaller testicle, and the open end of the jaws brought firmly together by a few turns of cord in the groove, and then tied. The parts outside of the clam are then cut off. The testicle on the upper side, as the horse lies, should be first operated on, and then the under one. On the second day after the operation, the clams should be removed, which is done by cutting the wax cord by which they are tied, when they readily come off.

Another method, much used, is by cauterizing, or searing.

The clams used in this operation are made of solid wood, and require, of course, no paste nor corrosive sublimate. A common firing-iron and a fire, or tinner's furnace, is also required. The operation, in all of its steps, is performed just as the one before described, until the clam is applied, and then, instead of cutting the testicle off outside of the clam, it is removed by passing the hot iron along outside of the clam. The clam is then removed, first loosening it a little to see if any bleeding takes place. If it does, touch the point again with the hot iron, and then remove the clam entirely. Either of the above operations, skillfully performed, will be very successful, but carelessly, may often prove fatal.

FRACTURES.

Fractures may occur in any of the bones, but are more frequently met with in the long bones. They are serious injuries, but not entirely out of the reach of treatment. I have treated successfully the pastern, the shank, the upper arm, and the lower thigh, bones. I shall only lay down the general principles to be observed, without describing, particularly, each fracture. This being done, any person with some ingenuity may reduce and bandage any fracture.

The nature and extent of the fracture are to be determined, and then the proper splints prepared. These may be made of wood, and hollowed out with a gouge, so as to fit the part to which they are to be applied, or a number of narrow splints may be used, being notched about an inch or two from one end, and tied together with twine, three or four knots being tied between each to keep them apart. Several bandages of heavy muslin are to be prepared, and rolled up. A quantity of starch is to be prepared, to soak the bandages in, or, what is better, a quantity of cumfrey-root, grated down into a mucilage. The fractured, or broken, ends of the bone are then to be brought together in their natural position. If the patient is on his feet, place the mate of the fractured limb on some solid

object, to raise the injured one up somewhat. Then, by having an assistant pull on the limb, with the hands adjust the broken bone. This done, if cumfrey-root is used, coat the limb with it by spreading the preparation on a cloth, and then bandage the leg with several thicknesses of roller. Then apply the splints in the proper place, to keep the fracture perfectly in place. I prefer the series of narrow splints tied together, as before described. Apply the splints, and then tie a twine around the middle, sufficiently tight to hold the fracture firmly in place; then tie the cords at the ends of the splints. After this dressing, the limb will be thoroughly encased in a hard shell. The horse will take care not to bear his weight on it, but he should be kept where he will be as quiet as possible. Cold water may be freely used above and below the bandage. If starch is used, instead of cumfrey-root, every bandage must be soaked in it before applying.

In some cases, it may be necessary to have the splints pass beyond a neighboring joint. In this case, a suitable iron splint should be used. When the bone is properly knit, the hoof will become warm, and the horse will be inclined to use the limb. The bandaging may then be taken off. But the horse should not be put to pulling for some time.

Fracture of the bones of the head may sometimes be met with, in which broken or loose pieces of bone may have to be removed.

FOALING.

As a general rule, the mare requires no assistance from man in this condition. But it may happen that the foal fails to come in the proper way, which is with the head forward, and becomes so entangled that the life of the foal or the dam may be endangered. When this is the case, a stout man with

some skill and good nerve may, by persevering effort, gently and firmly, so change the position of the foal as to enable the efforts of the mare to expel it. If it is impossible to so change the foal as to bring the head down properly, the operator may pass the hand up so as to get hold of both hind-feet, and bring them down so that the foal may come rump foremost. It may require considerable force to turn the foal, but there is no danger in it if it is patiently applied; but the parts already born should never be caught hold of for the purpose of pulling the foal away. The dam may be ruined by such meddling.

Taking the Foal Away.—Sometimes the foal is so large that it can not be born. In such case, if it is evident the life of the dam will be lost by longer waiting, the hand may be passed up until it rests under the fore-leg of the foal, an open knife having been carefully held in the hand, and then the leg of the foal carefully separated from its body by the knife. In this operation great care must be taken not to injure or cut the parts of the dam which closely infold the colt. If necessary, other parts of the foal may be similarly removed.

Taking away the Placenta.—Occasionally the mare does not clean in a proper time. This may cause inflammation. If inflammation is threatened, the placenta should be taken away. This may be done by passing the hand, well greased, far up, and beyond the parts to be taken away, and then grasping them and bringing them out with the hand.

Rupture in Foaling.—Sometimes the parts which lie between the fundament and bearing are torn in foaling, so that both openings are united. Some good may be done, in such a case, by stitching up the wound with a fine, curved, surgeon's needle and fine surgeon's silk, then keeping the patient's bowels loose. The prospects are not very favorable to a cure.

Since the above was written, I treated one of the worst cases I ever saw, successfully.

AFFECTIONS OF THE TEETH.

THERE is no particular disease of the teeth with which I have ever met, though I have often read of such. All the difficulties of importance with the teeth are the result of accident, irregular growth, or from the front grinders wearing out.

Wearing by the Bit.—When a horse is very old, and has been much used through life with the headstall of his bridle too short, causing the bit to rest on the front grinders, or if he has been in the habit of champing the bit, the teeth may become worn down to the forked roots, or prongs, and these spreading apart, will leave a space between them, into which the hay or grass gets so firmly packed that the horse can not get it out. This will keep the teeth apart and stop the process of grinding, and the horse will die of starvation, or from bolting or swallowing his food unground. Among those I have examined was an old huntress, belonging to my father. She was just twenty-six years old when she died. She lingered a whole summer. I was away studying when she commenced to decline, but happened to be at home when she died. On examination I found the teeth worn down so that all the prongs stood apart, and the space between them so tightly filled with grass that they met above and below, keeping the teeth entirely apart. Since then I have seen several, and relieved them.

Treatment.—As prevention is always better than cure, never rein the horse up so as to wear his teeth out in this way. But when the difficulty has occurred, which may be suspected if an old horse commences to decline without any other apparent cause, the only remedy is to extract, or pull out, the teeth or roots causing the mischief. This may be done with a common turnkey, made for the purpose, like those used by tooth-pullers, or with a strong pair, like dentist's forceps, made for the purpose.

Accidents to the Teeth.—These may occur from blows, kicks, or other violence, received about the mouth, and may be of very considerable or trifling extent. If merely knocked loose, they should be forced to their proper position, and the horse be fed on ground feed for a short time, until they become solid. But if left hanging by the skin or gum, or badly broken and loose, remove them by cutting the gum loose, and then use the forceps, if necessary, to get them out.

Irregular Growth of the Teeth.—One form of irregularity of the teeth, called "*fish-mouth*," is more properly owing to an unnatural growth of the under jaw, than to any defect in the teeth themselves. The jaw either not growing long enough, or too long, causes the grinders of one jaw to stand forward of those of the other, thus leaving a part of two pair unexposed to the wear of the grinding process, and which will, eventually, project so high as not only to interfere with grinding, but even to wound the gum. At the same time, the nippers not meeting squarely, but one set projecting forward of the others, they wear off unevenly, leaving sharp edges, which will wound the gum, and prevent the horse from grazing or properly gathering his food. A similar casualty is one grinder growing too far in or out, and the unworn portion, projecting above the level of the teeth, prevents the grinding process. This is sometimes called a "*buck-tooth*." In these cases, the horse will pine away and lose his flesh. When a horse commences to lose condition, without any known disease working on him, either lampass or one of these difficulties may be expected; the latter if the horse grinds his food, letting part of it fall out of the mouth, or if he turns his head to one side to chew.

Treatment.—The projecting portions of the teeth must be sawed off level with the other teeth; and a look-out must then be kept for the recurrence of the same difficulty, for it will be very sure to return. Perhaps in some cases it would be better to extract the offending tooth.

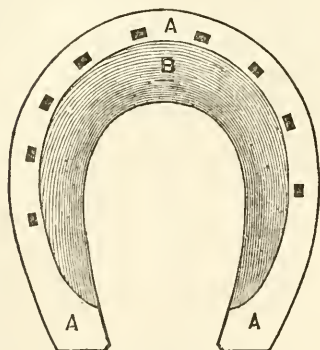
Occasionally the enamel wears off the grinders in such a way

as to leave a rough side next the cheek, causing an ugly sore. In this case the tooth must be rasped smooth.

Carious, rotten, or hollow teeth may sometimes be met with, but their occurrence is very seldom—doubtless would be very common if the horse were allowed hot feed.

SHOEING.

It is not, perhaps, positively known when shoes were first put on horses' feet. It has been over three hundred years since the



CONCAVE-SEATED SHOE.

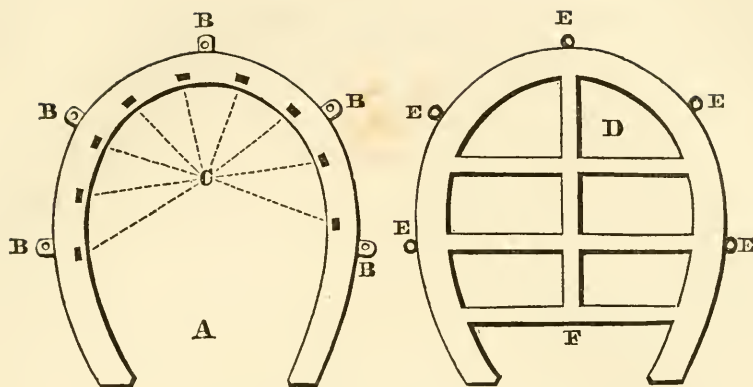
A, A, A, Seat of the wall of the foot on the shoe, the fullering being on the lower or under side.

B, The concaving or hollowing. Use as many nail-holes as is necessary. This is the near or left shoe, the last hole further from the heel on the inside.

practice of shoeing the horse was introduced into England. The amount and kind of service required of the domesticated horse is attended with a degree of wear and tear of the hoof for which nature has not sufficiently provided. Without some means, therefore, of preventing this extraordinary wear, the horse must be incapable of long performing much of the service required of him.

To accomplish this object the shoe is used. It is intended to protect that part of the wall of the hoof called the tread from wear, and guard the other parts of the bottom of the foot from accidents to which they are liable when the tread is much worn down.

The art of shoeing is one of much more importance than is generally supposed. It requires an amount of knowledge to practice it successfully, seldom possessed by those who follow it. The shoeing-smith should understand the anatomy of the foot thoroughly, the diseases to which it is liable, the influence of



DOUBLE SHOE FOR DISEASED FOOT.

B, B, B, B, Projections with screw-holes to receive screws of lower shoe.

C, Nail-holes to fasten upper shoe on the foot.

D, F, The bars pressing the leather against the sole.

E, E, E, E, Projections with holes; the screws pass through them to those on the upper shoe, to be tightened as necessary.

This shoe is especially applicable in the treating of pumiced foot.

shoeing in producing them, as well as every thing necessary to the skillful performance of his trade. It is true that general rules and principles may be laid down to assist him, and, to some extent, govern his operations, but much will depend on his judgment. If it be true, as it most certainly is, that shoeing is always attended with some injury to the foot, how much more evil may we expect when the operation is badly performed, as it must often be, when the smith is ignorant of the structure, nature, and movements of the complicated machine (for such the horse's foot may appropriately be styled) with which he has to interfere!

The injuries that are liable to be done to the horse's foot by bad shoeing are numerous, but not immediately inflicted. They are only the more dangerous on this account. They are brought on gradually, by the continued evil of bad shoeing. The horse is often totally destroyed in this way, the owner never suspecting the true cause of the difficulty, or if he should hint such a thing, his smith, watchful of his own interests, refers it to every thing but the right cause.

There are some smiths who know nothing at all of the anatomy of the foot, and who are too bigoted to learn any thing, who are wedded to some one particular form of shoe, and which they bring all feet to fit, *in a way*; with the same consistency and equal reason of the king who made a box of right length for himself, and determined that all his subjects should be made to fit it—those too short, to be stretched, and those too long, to be cut off.

I will state some of the errors which are most common among these one-ideal men. They make all shoes the same shape, or form; give the same concavity or bevel on the side of the web next to the foot; make the web of all the same width; make all the same weight and the same length; form the calkings, if any are used, the same for every horse, or only form a calk on one side of the shoe; use nails in all cases of the same strength; direct the nails the same for all kinds of work; nail too near the heels; make the fullering, or groove for the nail-heads to rest in, too far from the outer edge of the shoe; pare the crust, if they pare it at all, the same on both sides, but generally pare neither side enough; shorten all toes alike; do not pare the sole at all; they tear the old shoe off instead of drawing the nails, and thus injure the hoof; they fit the shoe entirely by burning; they cut down, or even cut away, the bars; cut down the frog; they cut away the inside of the crust in the vain effort to prevent interfering; and often go to the useless trouble of putting on clips, which are not only of no advantage, but positively injurious.

I shall now give in full the best practice to pursue in shoeing, considering each principle to be borne in mind separately.

First, *the shoe must agree with the natural shape of the foot*. This is a proposition that common sense ought to teach any man is correct, but it does not seem to do so in all cases. Many smiths, as before observed, adhere to a particular form of shoe, and endeavor to bring all feet to it. It is evident to any one, that if the hoof is long and narrow, the quarters but very little flaring, which is called a staple hoof, it requires a

staple shoe, that is, a shoe not much flaring at the quarters, but running back nearly straight. If such a shoe is put on a round hoof, the quarters will project over it, and the blacksmith may pare the projecting edge off, but, in so doing, he destroys a valuable part of the border of the wall which should rest on the web of the shoe.

If a round shoe be put on a staple hoof, the shoe will project too much at the quarters, and the heels of the shoe will come too close together and too much under. By coming too close together, they confine or press on the frog, and thus prevent its free motion as a wedge to cause the foot to expand or spread, causing it to be absorbed, or wasted away, and diminished in size. Causing the frog to be more or less confined, and, consequently, wasted away, is the main evil which necessarily attends shoeing. For this reason we should be particularly careful not to increase this evil by bad shoeing.

No shoe should be gathered in too far under the heel. The shoe should not be brought around perfectly even with the wall of the hoof at the heel, and terminate just even with the wall, as it is reflected, or turned in, to form the bars. Commencing at the back part of the quarter, the shoe should project a little beyond the crust, and still a little more as it passes back, and should extend beyond the heel of the crust about one-eighth of an inch, or a little more. Now, what is the object of thus letting the shoe come out further than even with the crust, as it passes from the quarter and back of the heel? I will explain. Nine-tenths of the shoes put on in this country are allowed to remain on for several months, or until they come off by long use. By the natural growth downward and forward of those parts which hold the nails, the shoe is carried forward, and if left even with the crust at the back part of the quarter and heel, must soon be carried so far forward that the crust, at these parts, will project over the shoe, and in a very short time the heel of the shoe will be found imbedded inside the crust between it and the bars, that is, on that part of the

sole which is the seat of corn. By allowing the heel of the shoe to project as described, it has a tendency to lead the crust outward, by the natural motions of the hoof, and thus oppose contraction. It also prevents the shoe from being drawn forward and imbedding the heel in the sole, where corns occur. It also interferes less with the free action of the frog than other forms of shoe.

The objections that have been urged to this form of heel for the shoe are, that it is liable to be trod upon by the other feet and torn off, that it affords insufficient protection to the heel of the sole, or the seat of corns, and that it offers greater resistance in mud or heavy ground to the drawing out of the foot. To meet these objections I would say, the heel is so far under that there can be but the least danger of the shoe being caught by another foot, unless it projects very much further than I have recommended. No width of web can prevent corns, and no narrowness produce them. If the crust at the heel is pared down too low, and especially if the bar is pared down, or the scaly horn over the seat of corn is left on, any shoe, however wide or narrow, will bruise the sole enough to produce corn. To the other objection, I have only to say that any foot will come out of the hole it makes in soft ground, and that, before the foot starts to raise, the heel is thrown forward and upward, so that the heel of the shoe has little or no resistance to encounter. I consider these objections almost groundless.

The Seating of the Shoe.—That part of the side of the web of the shoe which the crust rests on is called the seating. It is of the same width of the thickness of the crust, and should be perfectly level, so that when the crust is pared to a perfect level it will fit on it close enough to hold water. Nothing contributes more to making the shoe hold on than its perfectly fitting the crust.

The Concave of the Shoe.—The side of the web which is next the foot is not all left flat; but the inner part, from where the

crust rests on it, is beveled off, or concaved, as it is termed. This beveling off does not extend all the way around; it is only to be carried back to where the shoe passes over the bar, that is, past the seat of corn. This concaving is not to be made by bending down the inner part of the web, but it is to be done so that the beveling will appear as if it had been shaved out, leaving the outside exactly level.

The object of the concave is to prevent the iron shoe from resting on the sole and bruising it, which it would do, in many cases, if the side of the web next the foot were not beveled. This beveling is especially important over the seat of corn.

Some men speak very confidently of a broad web as a means of protecting the sole, and the seat of corn especially, but I can not see any great utility in it. Indeed, if a shoe could be made of sufficient strength, and only substitute the part of the tread worn off, it would be the best that could be invented.

It is only after the tread is worn down that the shoe is needed at all; it is never needed to protect from corn or bruise while there is sufficient horn to keep the sole from wear.

The Width of the Web.—From what has just been stated, it will be seen that the great object to be accomplished is not to cover up the bottom of the foot, but to furnish a substitute for that part which is worn off by the work required of the horse. We must imitate nature. The shoe should be of sufficient strength not to be broken or bent by coming in contact with a stone, and should furnish a surface to the ground that will stand a reasonable amount of wear. For these reasons it must have considerable breadth; but it is plain that a very broad, flat shoe will offer greater resistance to the constant expanding of the foot than a narrower one. The latter may yield a little, but the former none at all.

The shoe should be near a quarter of an inch wider around the toe than at the heels, for at the toe it is subject to the greatest wear and liability to be broken.

The shoe may vary in width for different horses, depending on the purpose for which they are used. A flat-footed horse may also need a broader webbed shoe than a cup-hoofed one, or one that has a very concave hoof.

The web of the racer's shoe should not be very much broader than the thickness of the crust. It is usually made so that it is about the same width inside of the fullering that it is outside of it. It is also made to fit evenly with the hoof around the quarters and heel. The horse for the farm or general purposes requires a shoe with a web somewhat broader than the racer, but by no means so broad as is often put on by those who think the shoe should cover a large portion of the sole.

Heavy draught-horses, of course, require the broadest web, for the strain and wear of their shoes are the greatest; nor does the additional weight greatly interfere with their slow motion.

Weight of the Shoe.—The weight of the shoe mainly depends on the thickness. The bar should be just thick enough to furnish the proper strength for the service for which the horse is required. A heavy road-horse requires a heavy shoe. The shoe should generally be of the same thickness all the way around. But certain impediments require a departure from this rule, which will be pointed out in the proper place.

The Calkins or "Corks."—Many smiths are in the habit of turning calkins, or, as they often call them, "corks," on all shoes, and alike for all horses, for whatever purpose they may be used. This is a most injurious practice.

Calkins are not only generally useless, but positively injurious. The horse that is to be used for heavy draught, on exceedingly hard, steep roads, or on ice or frozen ground, may require them, but for general purposes, on ordinary roads, they are an evil. When they are used, both should be of exactly the same length. In no case should a calkin be turned on one heel and not on the other. By this practice, which is often recommended

to prevent interfering, the most fatal injuries to the foot may occur.

The Nails.—The blacksmith should know the work the horse is intended for, so that he may make the nails to correspond. The nails generally used are too coarse; they cut up the hoof too much. They should be as fine as possible to have sufficient strength, and if the shoe is properly made and fitted there is but little danger from too fine a nail. Some smiths may say “a fine nail will not drive,” but if the nail is not made unnecessarily long, its being fine will have but little to do in preventing its driving. There is no necessity of the nail being any longer than just sufficient to come through enough to make a neat clinch.

Driving the Nails.—This is a most important part of the shoeing-smith's business, for in performing it there is danger of wounding the foot so as to bring on incurable disease. When we consider that many shoers know nothing of the anatomy or structure of the horse's foot, we can but wonder that they perform their work without doing much more injury than they do.

For the draught-horse, one used for drawing, or pulling, the nails should be driven so as to incline toward the heel about the width of the nail. When the nail is driven in this direction, the strain in drawing, or pulling, does not come square across the nail, but slightly in the direction of its length. The horn of the crust is less injured by driving the nails so as to incline backward, for they take nearer the direction of its grain. The nails should be driven so that they will all come out exactly the same distance up on the crust; if not, some nails will have greater strain on them than others, and be liable to come loose. Neatness demands that all should come out in a line. and there is much more danger of bringing the nails out too high up than too low down. There is no need of the nail coming out high up on the hoof, for it does not add to its security, and injures an unnecessary amount of the horn of the crust.

Number of Nails Necessary.—This is a point on which there is much difference of opinion, and many absurd notions entertained. Some good authors recommend as many as nine nails to each shoe; others eight; others seven; and some as small a number as five for horses of light service. It is very certain that the nails are principally concerned in confining the hoof, or preventing those spreading and contracting motions which are natural to the hoof, and on which its health and elasticity, or springiness, to so great an extent depend. For this reason that system of nailing should be adopted which will least interfere with those motions, and at the same time secure the shoe on the foot. Two questions, then, are to be considered: what is the least number of nails necessary to hold the shoe? and, how shall they be placed to least interfere with the expansion of the foot? Nature has so made the inner side of the hoof as to enable it to expand more than the outer, for it is thinner at the quarter and heel, the place where the expansion, or spreading, takes place, as the frog is driven or forced up.

From these facts it would appear that the outer side, or limb, of the shoe should be firmly secured, and the inner limb left as free as possible, so that the inner quarter and heel may move on it. Whatever number of nails are put in the inner side should be placed around the toe.

I would say, then, that for heavy draught-horses seven nails are sufficient, four in the outer limb of the shoe and three in the inner. It is not so injurious to this class of horses if the foot is more confined.

For lighter horses, and for quicker action, six nails will be enough, four in the outer limb and two in the inner, and these very near the front of the toe. Free expansion of the foot is of great importance to trotters and racers. A race may be lost by the slightest error or defect in shoeing, especially in the nailing.

The Fullering.—The groove, or channel, on the ground side

of the shoe is called the fullering. It has two objects, the principal one of which is to receive the heads of the nails and prevent them from being bent or broken off; its other object is to increase the security of the foot on the ground. The nail-holes, of course, are punched in the fullering.

The fullering should be as near the outer edge of the shoe as possible, and the nail-holes should be so punched as to slant inward, making the nail take nearly the direction of the grain of the crust. The nail-hole should come out on the foot, or upper side of the shoe, near the inner border of the seating, but never in the beveling, or concaving. Then, by a proper pointing of the nail, it can easily be made to come out rightly on the crust. If the fullering be too far in, the nail will have to take a direction outward to avoid wounding the sensitive parts of the foot, and in clinching it, the crust of the hoof will be forced in, or contracted. This way of driving the nails is called shouldering. It is one of the worst evils in all bad shoeing.

Paring the Crust.—The inside of the crust should generally not be pared down at all. It should be merely leveled, so as to give the shoe an even bearing. If it is pared down, the shoe will rest on the seat of corns. The paring down may be carried round the toe, and outer quarter, and heel, as low as necessary. After the shoe is prepared for being fitted, and the paring of the tread carried to sufficient extent, the shoe may be applied to it warm enough to mark any uneven points of bearing, which may then be smoothed off. The shoe should fit so close to the tread as to hold water.

A colt having crooked pasterns, leaning outward when first shod, may be benefited by paring the inside, and putting on a shoe thin on the inner side and thick on the outside. This subject is treated in another place in this work.

Paring the Sole.—When the horse is in the state of nature, or not shod at all, the crust, or tread, keeps worn down, and the scaly horn which covers the horny sole keeps worn off, leaving

the sole of its proper thickness and elastic, or springy. But when the horse is shod, the sole sometimes becomes covered with a thick layer of scaly, dead horn. This fills up the bottom of the foot, keeping the sole thick and dry, and injuring its springy character. And if the crust is pared down and a new shoe put on without paying any attention to this dead horn covering the sole, the new shoe will press on it, bruising the sole, and produce corns and other injuries. Hence, before putting on the shoe, all this scaly horn should be pared out with the blacksmith's drawing-knife. The sole should be pared until it will become quite springy when pressed on by the thumb. Especial attention must be paid to paring the sole at the seat of corns, which is the angle, or corner, between the crust and bar. In horses of quick action the elasticity of the sole is of the greatest importance, to prevent concussion.

But few smiths understand the necessity of paring the sole, and for this reason I must urge it upon their attention.

Fitting the Shoe by Burning.—This should never be done. It dries up the crust, and renders it harsh and brittle. It also presents to the seating a layer of dead, burnt horn, instead of that in its natural state. It does the very thing which every one should try to avoid.

There can be no objection to touching the bearing of the crust with the hot shoe to discover any high places that would prevent the shoe from fitting closely. But this must not be carried to the extent of burning. After the hot shoe has marked the prominent places, it is to be removed, and those places pared down.

Removing the Old Shoe.—Many smiths are in the habit of grasping one heel of the old shoe with a heavy pair of pinchers, and then, gathering the arms with both hands, by a series of wrenches, which often alarm the horse for the safety of his foot, and very justly, too, succeed in tearing off one limb of the shoe. The process is then repeated in the other limb, and the shoe is off. But in many instances the crust is wretchedly torn,

and no skill can fit a new shoe properly and neatly to the foot.

A sort of knife, thick on the back and thin on the edge, should be used. With this, the clinches are to be raised or cut off, and then the point of the knife placed on the point of the nail, and a slight tap on the back of the knife will start the nail. After the clinches are raised and the nails started, they can easily be drawn, one by one. No danger, no considerable loss of time, occurs in this method of removing the old shoe.

The Bars not to be Cut away.—The use of the bars is undoubtedly to prevent contraction, or to keep the foot properly expanded. They have been carefully and accurately described when speaking of the anatomy of the foot. They are placed in a situation which is somewhat in the way of the smith in paring the sole, and he often cuts them away to the very level of the sole. This is a most injurious practice. It robs the foot of its most powerful means of resistance against contraction. The knife should not at all be used on the bars, unless they should be torn and rough, when they may be trimmed smooth, and no more.

The side of the bar is sometimes pared off to give the appearance of a wide heel. This is very injurious, for it weakens the bars and disposes to contraction. This practice is condemned on this account by even those who recommend the cutting away of the projecting portion of the bars.

The Frog not to be Cut down.—Blacksmiths, generally, seem to have an unaccountable itch for cutting away the frog; and why this is so would seem hard to explain. It is not at all in the way in shoeing. It only adds to the work to be done to cut it away. I can see but one reason for it. The frog is a body of rather soft, or spongy, horn, and under a sharp knife, whittles, or clips off, very nicely. It is a sort of Yankee gratification, like whittling a pine stick. This is the best apology I can conceive for this ruinous practice.

Let the smith ask himself what the frog is there for, and if he can not see any evil in it, let him not cut it away, for surely nature intended it for some useful purpose, and he should not ignorantly destroy it.

But it has two useful purposes. It serves as a wedge to expand the hoof and let the sole spring freely, and, at the same time, sustains a part of the weight of the horse. It is also a shield for the sensitive frog, a very important organ which rests on it.

The cutting away of the frog lessens its bulk, causes it to become dry and hard, and contract, thus permitting the heels to wire in. Thrush or quittor may be the result of cutting down the frog. The practice will invariably bring about the destruction of the frog. The best rule that can be pursued is never to apply the knife to the frog. Scales or splinters toward the point of the frog might be cut off; but I fear granting even this privilege, for some might go even further. Nature will not fail to remove these scales soon.

Cutting the Inside of the Crust.—It is a very common practice to cut down the inner part of the tread and rasp off the side of the crust to prevent interfering. This is a very injurious error. The lowering of the inner heel throws the fetlock-joint inward toward the line in which the other foot moves, and really makes the difficulty worse. It is also very likely to produce corns to cut down the heel in this way.

Rasping off the side of the crust may do something to prevent interfering. But it weakens and dries up the quarter, and this evil far overbalances any good it may do.

The only way to successfully prevent interfering, is to bring the outer side lower than the inside. This may be done by rasping the outer side very low, or by putting on a shoe with a web, thick on the inside and thin on the outside. Nothing but injury can result from one-sided calkins, which are sometimes used. On soft ground they sink and do no good, and, indeed, will sink in most soils and roads, and, therefore, are use-

less, except on hard roads. If an elevation is needed, make the heel of the shoe thicker, thinning off toward the quarter. This will not sink in hard roads.

VICES OF THE HORSE.

HORSES, like men, are endowed with an endless variety of tempers or dispositions, and these differences are still more extended by the breaking and management of the horse. There are certain dangerous and disagreeable habits to which some horses are given, either from a naturally bad disposition or from faulty management, which it is important to understand. Such habits may render the horse totally unfit for any use, may impair his usefulness for many purposes, or may only require greater care in his management. Any such vices really injure the value of the horse to a greater or less degree.

RESTIVENESS.

A naturally bad or vicious temper, and which is generally aggravated or made worse by faulty and cruel management, whether it is shown in biting, kicking, rearing, plunging, bolting, striking, or in any other habit which threatens injury to those using the horse, or to himself, is included under the name of restiveness. It is very difficult to break a horse of restive habits. Some horse-tamers have been very successful in bringing such animals to gently submit to the dominion of man. But the least error in the management of such a horse will generally cause him to relapse into his former vice. In the history of horsemanship several celebrated tamers have been noticed, and almost every neighborhood has some genius noted for his ability as a tamer. A fellow by the name of Jumper, in Yorkshire, is spoken of by Youatt, whose system seems to have been to use the utmost violence with the horse,

and perfect fearlessness. But in some cases, after long contending with his subject, he would resort to quite gentle means. The most celebrated tamer, however, was the Cork Whisperer, so called because it was supposed his charm consisted in whispering to his subject. His name was Sullivan. He would go into the stable with his subject, and, after remaining some time, would come out with the animal perfectly subdued. It is most likely his art consisted in perfect fearlessness. A vicious horse would tremble if Sullivan but spoke to him. His power was complete; he never failed to subdue his subject.

The most distinguished of horse-tamers of the present time is Rarey, of our own country. He has exhibited his art in this country and Europe, to the wonder and satisfaction of all who have witnessed his performance.

BITING.

Some horses, from natural viciousness of temper, resort to biting, as a means of preventing man from handling them. But the habit is generally induced by the mischievousness of boys about the stable, pinching the horse to see him nip at them. The horse acquires a love for the fun, and presently nips to the red, and finally becomes so confirmed in the habit that it is dangerous to be about him. A severe clapboarding may deter him from it, but cure is not always possible. The only safe way is to prevent that sort of play with the horse that gets him into the habit. It ruins a horse, because it renders him unsafe.

VICIOUS TO CLEAN.

Some horses will hardly submit to being cleaned. They resort to stamping, biting, and kicking to avoid it. Some horses may be made to stand quiet by taking a clapboard and slapping their sides until the horse is subdued; but don't give another lick, for he may be aroused to show fight. If this or gentle treatment does not answer, have a ring placed

so as to draw the head up high. He will then be obliged to keep reasonably quiet; he can not do much with his feet when his head is drawn up.

VICIOUS TO SHOE.

The young horse, or colt, should have his feet often taken up and handled, so that he may become accustomed to it. But some horses may resist the smith in this operation, from a vicious disposition, and may require great means of restraint. It is proper in this place to condemn that violent treatment which we too often see practiced in this country, of kicking, striking, and cursing a horse for the least uneasiness while this operation is being performed. Good shoers never resort to such treatment, and seldom have occasion to in any way confine the horse. When gentle treatment or, at most, a little clapping fails to render the animal submissive, he must be confined to the necessary degree. It is not difficult to keep the fore-leg up. It is raised and tied to the arm above the knee. A twitch may be necessary while putting on the fore-shoe. The most difficult part of the operation is putting on the hind-shoes. A rope may be tied around the pastern, and carried across the rump, and then around in front of the breast, and held by an assistant standing on the side to which the limb to be raised belongs. If the horse jerks the foot out of the smith's hands, the assistant draws the rope so he can not get the foot down. The horse will soon get tired of his resistance, and permit the work to be done. A very vicious horse will require to be put in the stocks, as it is not right to endanger a man's life with any horse.

BAD TO BE MOUNTED.

This may result from unwillingness of the horse to be ridden, or from eagerness to be off. In the former case the vice may be natural, from an ill temper, or the fruit of ill treatment in

breaking. It is a very disagreeable and even dangerous habit. It is difficult to correct. Such a horse is only safe in the hands of a young, stout man. He is unfit for the saddle, whatever his gait. When the vice is only the result of eagerness to go ahead, it is not so disagreeable; but it is not free from danger to the rider. An eager-dispositioned horse is easily let run into this habit. An active, quick horseman may do much to break a horse of this habit, by mounting him at the first intimation, and then holding him steady for a short time. Gentleness and firmness are required to manage such a horse.

BALKING, BACKING, AND GIBBING.

These habits are all the result of the same vicious disposition. Backing explains itself quite well. The horse will back instead of going forward; or he may refuse to move for some time, and then, instead of going forward, commence backing. He shows the most sulky temper. A balky horse may refuse to start, and after a while start off and work well all day; at other times he may balk at first, and then go well for a while, and stop still, and remain so for some time, and then go on again. In fact, there is no dependence to be put in such a horse. No one, however, can fail to understand when a horse is falling into this vice.

Bad management in breaking is the most frequent cause of balking. No weight should be thrown on the collar until the colt has become accustomed to its presence on the shoulder, and then very little pressure. Nor should this be allowed at starting. The colt should learn to tolerate every thing connected with moving in the harness before being required to pull. Allowing the shoulder to become sore and tender may get the horse into the habit of balking, or requiring him to attempt to draw too heavy a load, or an ordinary load through a mud road, until he is exhausted and unable to go further, and then whipping him to force him to go. Some

horses will not pull on a cold collar. Some horses and some stocks of horses are peculiarly disposed to become balky.

Care in breaking is the only safe means of guarding against this evil. The best conditioned horse may easily be made to balk, by putting him to pulling when first geared. Let him become thoroughly used to the harness before being required to pull; and then let but little weight on the shoulders at a time, and gradually increase it.

After the habit is acquired, but before it has become confirmed, especially if the horse backs at starting, it may be obviated by having a stone behind the wheel of the vehicle, or being careful to start down hill. This, with gentleness and persuasion, is the best treatment.

A balky horse may be compelled to do work at the off wheel in a four-horse carriage. The prospects of curing a balky horse are very uncertain.

SHYING.

There is no more disagreeable habit in the horse than this, when it is once confirmed. Playfulness often manifests itself in this way, the horse affecting to be very much frightened at some trifling object. The horse soon gets over this when put down to his work. Genuine cowardice is another cause of shying. The imagination of such a horse is very active; he sees danger in almost every thing. Much may be done by firm, kind treatment, to show the horse that his fears are unfounded. In no case will giving way to his foolishness do. It will convince him that his fears were correct. He should be perfectly familiarized with the objects of his fears. By this means their number may soon be much decreased, and the horse rendered more agreeable.

But the worst form of this vice, doubtless, results from defective sight. This defect can not be remedied, as with man. Nor will it do to make use of violence to overcome it. Blinds may be used on such a horse to prevent him from

seeing the objects around, which his defective sight renders frightful to him. Blinds may be used at the sides, and also arched over in front of his eyes, so that he can only see the road for a short distance before him.

RUNNING AWAY.

This very dangerous vice may be the result of fright, or it may be the means the horse takes of getting rid of his rider or the carriage he is hitched to. If the horse is disposed to run under the saddle, a good rider may let him run, and put whip, spur, and curb to him, and give him more running than he bargained for. In this way he may be broke of the habit. However, a strong curb and a sharp bit should be used, and the horse closely watched. The bit and bridoon is the best form of bridle for such a horse.

When the horse is disposed to run in harness, some of the various forms of stiff bit in use may be resorted to. The best is that called the pelm-bit. But the sooner such a horse is sold for some purpose for which he is fit the better. He is too dangerous for the carriage under any circumstances.

SLIPPING THE HALTER OR THE BRIDLE.

This vice is very common among horses in this country. Some of them become as expert at it as the thimble-rigger in handling "the little joker." The habit, once contracted, is difficult to remedy.

A tolerably broad strap may be made to buckle around the neck, to which the headstall of the halter or bridle may be attached by buckles and straps. The collar can be drawn tight enough around the neck without choking the horse.

STUMBLING.

Stumbling is one of the most dangerous and disagreeable vices of the horse. It seldom admits of remedy to any extent, and no care in the rider or driver can prevent the horse from

stumbling. It may be caused by tenderness of the feet, grogginess, or old lameness, or habitual carelessness. But the more common cause is heavy-headedness, or the legs being too much under the horse. A stumbler is unfit for the saddle or carriage. His place is in a team, at slow, heavy work.

Some good may be done by keeping the tread well pared down, and the toe as much pared off as it will bear, or a shoe put on with the toe rounded off about the same that it becomes after two or three weeks' wear on such a horse. It is the result of erect shoulders.

WEAVING.

This is an incessant moving of the head from side to side, like the motion of the weaver's shuttle. It is a species of restiveness resulting from an uneasy temper and dislike to confinement. It may be remedied by tying the horse short; but such a horse is hard to keep in condition.

PAWING.

Some horses of a restless disposition are in the habit of pawing violently and incessantly in the stall. The litter and floor of the stall are torn up, the shoes knocked off, the hoofs battered, the foot bruised, and the legs strained. No remedy.

ROLLING.

Some horses acquire a habit of rolling not only when at grass or in the pound, but in the stall. In the latter case it is attended with some danger, as the horse may become tangled in the halter rein and strangled, or injure himself against the timbers of the stall. No amount of injury he may suffer will break him of the habit.

The horse should be tied with length enough of halter to lie down, but not enough to let his head lie flat on the ground; for, in order to roll, the horse has to place his head flat on the ground.

QUIDDING.

In chewing, the horse sometimes drops the hay from his mouth, only partially ground, instead of swallowing it. This is called quidding, because the act somewhat resembles that of the cow chewing the quid. It may be caused by irregular teeth. If so, they should be rasped down. (See the article, "Affections of the Teeth.") It may be caused by sore throat. Then the horse will swallow his water with a peculiar gulping sound, and show other symptoms of disease. In this case treat the sore throat, (catarrh), and the quidding will be remedied.

NOT LYING DOWN.

Some horses seldom or never lie down in the stall. They may keep in good condition for a long time, and appear to suffer but little. But generally the habit is attended by swelling of the legs, and the horse tires easily. No coercion will compel him to lie down.

He should be allowed a box stall or a stable where he need not be tied, and then a comfortable litter, and he may be induced to lie down. Occasionally a horse will not lie down except he is tied in his stall.

CUTTING, OR INTERFERING.

This defect consists in striking of the inner border of the hoof against the opposite pastern as the foot passes forward. Either fore-foot or hind-foot may strike the opposite pastern, or the horse may interfere with both feet or with all of them, both before and behind. The point usually struck by the border of the hoof or shoe is at the side of the tuft of hair which covers the pastern-joint. The cut, or rather bruise, may be very slight or quite severe, causing swelling or lameness. It is caused by a defect in the form of the horse, the legs being too close together, or the feet turned inward. There is no necessity for operating on the foot which strikes the opposite fet-

lock. The true principle is to so pare and shoe the foot that is injured as to throw the fetlock-joint out of the way of the opposite foot as it is carried forward. Leave the tread on the inside as high as possible, and pare down the outside very low. Also make the inner side of the shoe thick and the outer side thin. By this arrangement the fetlock is thrown outward, out of danger, when the foot is resting on the ground. The shoe on the foot that strikes may be beveled under slightly at the inner border.

OVERREACH.

Overreach is a wound of the heel of the fore-foot. It is of a similar character to tread—is caused by the toe of the hind-foot striking the heel of the forward one. Defective or bad form will predispose a horse to overreach. Bad shocing will also be liable to cause the hind-foot to catch the forward one.

The same care and objects are to be observed in making the examination of the wound as in examining tread. It may terminate similarly.

Some horses strike the sole of the fore-foot with the toe of the hind one, when moving, causing a continual series of clicks. This is called *forging*. It is closely allied to overreach.

Treatment.—If the horse is in the habit of overreaching, or if he forges, the toe should be well pared down, and the point of the shoe beveled back, or under.

When a wound is once made by overreaching, it is nothing else than a wound of the coronet, and is to be treated as such. (See treatment of “Wounds of the Coronet.”)

CRIBBING, OR CRIB-BITING.

This vice is also known by the names of *stump-sucking*, *wind-sucking*, etc. The act is performed by the horse grasping with his teeth the edge of his trough, rack, or manger, or any other convenient object, and, by curving his neck in a peculiar man-

ner, uttering a sort of guttural sound, or grunt. That the air has something to do with the production of this sound is certain, but just exactly in what way is not so well understood. Some contend that in the act air is forced into the stomach, while others think it is performed for the purpose of expelling air from the stomach which already existed there. It has also been supposed that in the act air is first forced into the stomach, and then expelled. I have seen a man swallow tobacco-smoke and then force it out of the stomach by belching, some seconds afterward. This operation is done by a similar action to that of the crib-biter. Now, from the motions and peculiar exertions of the horse, and the sounds observed in the act of crib-biting, I have no doubt of a portion of the wind being taken into the stomach. But when we reflect that belching is not even possible with the horse, even when it is evident the stomach is much distended with gas, as in cases of colic, it can hardly be supposed that the crib-biter can have acquired so readily the art of expelling wind from his stomach.

But the most important question to determine is, does the habit, or vice, of cribbing injure the health of the horse and constitute unsoundness? That it does injure the health I think no close observer can doubt. The horse addicted to it almost invariably falls away in flesh, and is much more liable to colic than other horses. I believe none doubt that they are generally subjects of some form of indigestion. That the vice is most likely the cause of indigestion, and not indigestion the cause of the vice, I think tolerably well proved from the fact that colts, when first taken from the pasture, are often confirmed cribbers. And again, the habit is as often contracted by horses that have been to all appearance in the best of health. Such a thing as a crib-biter with a good, healthy coat can hardly be found.

Now, let us sum up the facts referred to. In the first place, we have presented a horse with an admitted vice, so disgusting and so annoying that he can not be used without all those finer pleasures which we derive from the use of the horse

being destroyed. He is the victim of colic, always the subject of some form of indigestion or other obscure ailment, and by his hoggish grunting is a nuisance to the farm-yard, unless manacled with some of the devices for keeping him from practicing his vicious habit. If all this does not constitute a case of unsoundness, I am at a loss to know what would.

Treatment.—A strap tied around the neck close to the jaw will prevent the practice of cribbing; but it is also liable to cause thick wind, which is a worse trouble. Bar-soap rubbed on the trough, or whatever in the stall the horse gets hold of with his teeth, is recommended to prevent his taking hold of it. Or take three bars of iron curved in the shape of a sleigh-runner, one placed at each side of the face, the turn being downward and looking forward, and fastened together at the top by a headstall, and also a curved bar running behind the chin, and to which the third curved bar is fastened in the middle and which passes down, and the turn passes under the chin and mouth. Thus we have an iron sleigh, with three runners, hung to the horse's head. But a bar passes across the noses of these three runners to hold them in place; also a strap loosely passes over the nose, joining the two sides. By this arrangement the horse can raise his head to eat hay, but when he brings his head down to the trough he finds the middle runner of his sleigh across his mouth. The strap across his nose keeps him from throwing the machine back from under his mouth. The apparatus is taken off for the horse to eat his grain or feed given in the trough. Make his rack high.

DIVISION II.

HISTORY, BREEDING, RAISING, AND MANAGEMENT OF THE HORSE.

HISTORY OF THE HORSE.

LARGE volumes have been written on the history of the horse. The subject is coextensive with man's civilization; and, as we have but fragments of the history of the earlier periods of civilization, our knowledge of the horse in those days of antiquity is limited and unsatisfactory. Just what part of the Eastern continent the horse first inhabited is difficult to determine. He was, doubtless, a wild inhabitant of some country, long before his domestication by any nation. Sacred history furnishes us the earliest record of his being reduced to the dominion of man. Many weaker animals were domesticated and used as beasts of burden before the horse. The ox, the sheep, the goat, the ass, and the camel were all extensively used before the horse.

It appears, both from sacred and profane history, that the first use to which the horse was put was drawing chariots, and these were principally used for the purposes of war. The horse was certainly used for drawing wheeled carriages for some time before he was ridden. That Egypt was the first country in which the horse was domesticated is quite certain. Wagons, which were probably drawn by horses, are spoken of in the fifty-fifth chapter of Genesis. They were sent by Joseph into Canaan when he sent for his father's household. This was about 1706 years before the Christian era. It is not long after this until chariots are spoken of, and horsemen. These war chariots are

known to have been drawn by horses, and the horsemen were armed, and often came down from their chariots and fought on foot. Profane history informs us that Sesostris, the Pharaoh whom it is probable Joseph served, had twenty-seven thousand war chariots. That chariots and horsemen were common in Egypt at the time of Jacob's death we infer from the statement that when Joseph took his father's remains into Canaan, "there went up with him both chariots and horsemen." This was about 1689 years before the birth of Christ. When the children of Israel fled from Egypt we are informed that Pharaoh pursued them with "six hundred chosen chariots, and all the chariots of Egypt." This was about 1491 years before the birth of Christ. From Egypt the domesticated horse was taken to Canaan and other neighboring countries. After their journeying in the wilderness, when the Israelites reached Canaan, they were met by the Canaanites "with horses and chariots very many."

Such are the earliest records we have of the domestication of the horse. We are led to conclude that his usefulness was, probably, first discovered under the administration of Joseph, in Egypt. When Joseph undertook to store away the immense quantity of provisions required for the approaching famine, we may fairly conclude, the limited and slow means of transportation he possessed were entirely inadequate to his necessities, and certainly so wise a ruler would be led to seek other facilities. Nothing could be more natural than the attempt to render the horse serviceable in such an emergency. His first use, we have seen, was probably to draw wagons. And it is a remarkable fact that such is yet his most valuable purpose. If our conclusions are correct, the world owes to that pure and holy ruler the credit of subduing to the dominion of man the most valuable of the animal creation. If he is a benefactor to man who teaches how to make two blades of grass grow where only one grew before, what should be the position assigned to him who taught man the use of the horse, on whose valuable

qualities depend the happiness and subsistence of millions? In this view Joseph becomes not only the temporal benefactor of his own family and nation by having been sold into Egypt, but of the human family generally. Surely "he was sent to prepare the way of life."

The Greeks affirm, in their Mythology, that Neptune struck the earth with his trident, and the horse appeared. But it is certain that those parts of Greece most celebrated for their horsemen were originally colonies from Egypt. The horse was evidently introduced into Greece from Egypt. The Olympic games, including chariot and horse-races, were instituted in Greece about 1450 years before the birth of Christ.

Notwithstanding the superiority of the Arabian horses, their introduction into that country is of comparatively recent date. In the seventh century, when Mohammed fought the Korcish near Mecca, it is stated that he had but two horses in his whole army, and after the slaughter, large numbers of other animals are stated to have been carried off, but no mention is made of horses. The Arabs had few horses as late as the seventh century, and they were not noted for their excellence. Two hundred horses were presented a powerful Arabian prince by the Roman Emperor, in the seventh century. These were Cappadocian horses. About the same time others were introduced into Arabia. These horses were preserved with the greatest care, and from such importations is said to have sprung the justly celebrated Arabian stock.

This view of the origin of the Arabian horse does not agree with the observations of Layard. Among the remains of the cities of the desert, particularly Nineveh and Babylon, were found sculptured images of the horse, which are almost perfect representations of the Arabian of the present day. They are to be seen in the British Museum. Layard is convinced of the very great antiquity of many of the Arabian horses, whether the stories of their owners be true or not.

Not only Arabia and Greece, but even Persia derived her

horses from Egypt. But it is very probable that Egypt herself derived her horses from the interior or north of Africa. It is proper to state that no celebrated stock of horses of the present day are traced to Egypt. In noticing the different stocks of horses we shall begin with Africa.

THE BARB.

This breed is found in the Barbary States, particularly in Morocco and Fez, and the interior of Tripoli. The Barb is remarkable for his fine and graceful action. He is seldom over fourteen hands high; his shoulders are flat, chest round, joints long, and head particularly beautiful. His form is superior to that of the Arabian, but he is not equal to him in spirit and speed. The excellence of the Spanish horses is owing to this blood. When Spain was overrun by the Moors they left the country with a greatly improved stock of horses, from the cross between the Spanish horse and the Barb. Some of the most celebrated English race-horses trace their origin to the Barb, either through sire or dam. The *Godolphin Arabian* was a Barb. The *Wellesley Arabian* was probably a cross between the Barb and the Arabian.

In the interior of Africa, in the kingdom of Bournou, is found a breed said to be superior to either the Barb or Arabian, combining the perfections of both. Other horses of Africa are of little account. They are found in the South and West, among the barbarous tribes.

THE DONGOLA HORSE.

This stock is found in the kingdom of Dongola, and in the districts lying between Egypt and Abyssinia. The Dongola horse is full sixteen hands high, short in body, the neck long and slender, crest fine, withers sharp and high, but the breast is narrow, the quarters and flanks flat, and the back carped.

They are horses of speed and durability, and much prized as war-horses. Some of them have been taken to Europe, but have not been very favorably received. They are highly spoken of, by some, for their beauty, action, and docility.

THE ARABIAN.

Arabia began to become famous for her horses about the thirteenth century, and she has held her supremacy ever since. So carefully have they preserved their stock from coarse intermixture, and so perfectly have the true principles of breeding been followed, that their stock have attained a degree of perfection unequalled in any other country.

There is said to be three different stocks of horses in Arabia. The inferior breed, which are not prized, and are found wild in some parts, they call the *Attechi*. The next are the *Kadischi* breed, of an unknown race, and corresponding to horses of half-breed. These are sometimes put off on dealers for the genuine royal breed. The third stock are the genuine, thorough-bred descendants from the original stock of Cappadocian and other superior horses imported into Arabia. They are called the *Kochlani*. Layard found the best of these among the Shammar and Aneyza tribes. The Arabs assert that the genealogy of the true Kochlani is known for two thousand years, and that they trace back to the stud of Solomon. This may be believed by the visionary Arab, but is not true for that reason. Many of them have written pedigrees for over four hundred years. The pedigree is always kept on the side of the dam, and with a care excelling that bestowed on the genealogy of the most distinguished family. If our breeders could learn from the Arabs to pay more attention to their brood-mares, and not less to the stallion, they would soon find a substantial improvement in their horses.

It is extremely difficult to induce an Arab to part with his mare, if she be of the true *Kochlani* breed. He loves her as

he does his own children. She seems to be an inseparable part of his being. A stallion may be obtained, but the price that has to be paid is almost fabulous.

The Arabian horse is seldom over fourteen and a half hands high; his head is inimitably beautiful—the forehead broad and square, the muzzle short and fine, the face bony and the veins beautifully coursed, the nostrils wide, the ears small and well set, the eyes large, prominent, and brilliant. The neck is fine, and rises beautifully from the shoulders; the withers are high, and the shoulder is perfect in its form and position, and particularly in its inclination backward. His body is light and narrow before, but the chest swells out behind the arms so as to afford sufficient capacity for the lungs. His quarters are strong, muscular, and well set. His legs are small, flat, and sinewy, and the pasterns oblique in their position. The muscles of the arm and ham, which are full and powerful, have every advantage in the flat, bony, and sinewy leg. In spirit, the Arabian is equal to his great physical perfection. He would die rather than give up; and yet, with his native master of the desert, he is the most docile and kind animal in the world. The Arab sleeps with his mare, and makes his pillow of her neck. His children play with her as with a family dog. His sagacity is equal to his other noble qualities. If his master, overcome by the heat of the desert, lies down to sleep, he keeps watch over him, and arouses him on the approach of man or beast. He lives on scanty food and performs extraordinary journeys. Layard thinks few genuine Kochlani horses have been imported either into Europe or America. The stock of tall, thin, long-headed, spotted, vicious horses, called Arabians, are the most miserable of all our stock. They have no characteristic of the Arabian.

THE PERSIAN HORSE.

He has been celebrated for many hundred years, much longer than the Arabian. His size is near the same, perhaps a little

larger. He is equal in speed and beauty, but inferior in endurance.

THE TURKOMAN HORSE.

In the south of Tartary are a breed of horses celebrated for their purity and endurance. The head is large, the legs long, and not very well proportioned. They stand from fifteen to sixteen hands high. One of them has been known to travel nine hundred miles in eleven successive days.

THE TURKISH HORSE.

These are said to be descendants of the Arabian, crossed with the Persian. They possess many of the good qualities of their ancestry. The English thorough-bred has been improved by the Turkish. Some of the best English horses are descendants of the Turks.

OTHER ASIATIC AND EUROPEAN HORSES.

There are other breeds or stocks belonging to the Eastern continent which deserve mere mention. The *East India horse*, the *Turko*, from the *Turkoman* and *Persian*, is beautiful, docile, grand and stately in his carriage. There are other cold-blooded stocks found in India. The *Chinese horse* is small, weak, ill formed and spiritless, like his master. The *Tartar* and *Calmuck horses* are small and not at all well made. They are not far in advance of the wild horses of the country. They are capable of considerable endurance, and often perform great journeys on very scant fare. The horses of the *German States* are mostly large and heavy, and better suited for heavy draught than for action. The *Hungarian horse* gives some proof of Eastern blood, being lighter and possessing better action. The spirit of improvement is bettering the German horses generally. Holstein furnishes a large portion of the French cavalry horses.

The horses of *Sweden*, *Finland*, and *Norway* are small, well

formed, and of good spirit and action. They are not generally over twelve hands high. They are found in a semi-wild state in the forests, and taken up when wanted for use. The *Iceland horse*—by some said to be of Swedish origin, by others of Scotch—is small and active, and relies upon his own resources for sustenance. They are caught and shod when wanted by the peasants. The *Flemish* and *Dutch horses* are strong, large and well formed. They are superior for heavy draught. They have been made to improve the English cart-horse. *France* produces several breeds of horses. They are adapted to the saddle, the light carriage, and for cavalry. The Norman is the most prized. The *Spanish horse*, early celebrated for his many elegant qualities, was still more highly improved by the admixture of Barbary blood, resulting from the conquest of the country by the Moors. The *Spanish horse* is decidedly fine, and shows indisputably his nobility of ancestry. The *Italian horses* once possessed some celebrity, but have no superior merit at the present day. Some of the *Neapolitan horses* are large and imposing in appearance, and suited for the carriage. Italy has degenerated, and so have her horses, but it is hoped the sun of her glory may yet return again.

THE ENGLISH HORSE.

In Great Britain there are a great variety of horses to be found. But there are certain breeds which it is necessary to describe, in order to the more full understanding of our own stock of horses, which are, to a very great extent, derived from the English.

THE THOROUGH-BRED HORSE.

I shall not trouble the reader with the lengthy history of the various stages of improvement through which the English thorough-bred, or race-horse, has passed. In no country has so much attention been paid to developing the running qualities of the horse, and it is quite certain in none has

such perfection been attained. The race-horse of the present day is said to be of purely Eastern origin. He is descended from imported horses—from Arabians, Barbs, and Turks. Among the most celebrated imported horses may be mentioned an Arabian, imported in the reign of Henry I, 1121, which was the first importation on record of Eastern stock. The next well authenticated importation took place in the reign of James I. An Arabian was first tried, but condemned; then the White Turk, and shortly afterward appeared the Helmsley Turk, and then Fairfax's Morocco Barb. It was not until this period that the true value of the Eastern blood began to be appreciated.

At the Restoration a new impulse was given to racing, and Charles II sent to the Levant and purchased broodmares and stallions. These were principally Barbs and Turks. Private enterprise was not idle, of course, and other importations were at the same time made. In the latter part of the reign of Queen Anne, Mr. Darley imported the Darley Arabian, from which the English stock was still further improved. From him descended Flying Childers, Bartlett's Childers, Almanzor, and others of celebrity. The descendants of the Childers were very numerous. Among the most noted were the younger Childers, Blaze, Snap, Samson, and Eclipse. There were a host of others, however, of much merit. Eclipse was the fastest horse of his day. He never lost a race, and never paid forfeit. He was a thick-winded horse—a roarer. He left a numerous progeny, of which three hundred and thirty-four proved to be winners. He died in 1789, at the age of twenty-five years.

After the Arabian stock had been raised to repute by the Darley and his descendants, the Godolphin Arabian, which was really a Barb of great beauty and action, was picked up in France and brought to England. Much of the finest racing blood of Great Britain is descended from him.

The English thorough-bred is the Eastern horse, brought to

the highest degree of perfection by the influences of a pre-eminently favorable climate, the most careful breeding, and by every attention the art of horsemanship can devise. His form has been so much changed as scarcely to be recognized, and his fleetness has certainly been greatly increased. It is not merely for his performances on the turf that the thorough-bred horse is interesting to us. It is to him we look for the improvement of our horses for nearly every purpose. A description of him may not, therefore, be uninteresting.

Of all breeds, perhaps, the racer, or thorough-bred horse, is the most useless for the general purposes of the farmer. Not one out of fifty would be worth raising for such service. He is not fit for the cart, the plow, nor the carriage. For the two former purposes he is neither able nor willing. For the latter he is willing, but not able. If the race-horse is put to the cart or plow with a heavy horse, he is too fast for the heavy one, and soon becomes heated. And the more the racer is heated, the more passionate he becomes; and if he can not get to go ahead, he will become sullen and will not pull at all, and he can never again be made to pull. He will, with very few exceptions, suffer death first. Light, quick, single draught is all that he is at all fit for. As to hunting, he is entirely useless. He can not jump high. Even if he could leap, he is too light to carry the weight of a man in the descent over a wall or fence five or five and a half feet high.

The thorough-bred race-horse is long in the body, has fine ears, prominent eyes, and is remarkably wide between the jaws, wide nostrils, and small, thin lips. His neck is long and fine, his mane very thin, and lies close to the neck. When standing, his neck, on the top, is almost straight, his withers remarkably high and thin, his back low at the withers and straight to the haunches; he is high and close coupled, and very long, measuring from the haunch to the turn of the rump, and long and thin from there to the tip of the hough. He stands with his legs rather under the body than erect; this gives him great power

of springing to force himself forward. His tail, like his mane, is slight, and thinly haired. His buttocks seldom touch each other; his legs, below the knee and hough, very small, the back cords almost as visible as if the skin were taken off; the hair on the legs is very fine, and no fetlock tuft; his hoof is small and cupped. The only mark of superior strength in the thorough-bred racer, or turf-horse, is his chest, which is wide and deep. His ribs are very much curved, making his body round. He is very light in the flanks, and his belly remarkably so.

THE HUNTER.

The hunter of former times was a horse of large size, and capable of making a great leap. He was not required to have much blood. The hunter of the present day is, perhaps, three-quarter-bred, is much lighter and more fleet. His qualities and action are of but little value to Americans, who seldom indulge in the sports of the chase. He is not a distinct breed, and has not been perpetuated in this country, though we have many horses that would do well for the chase.

THE HACKNEY.

The hackney, like the hunter, is not a distinct breed, but is a horse peculiarly adapted, in his size, carriage, and paces, to the saddle. He is produced by crosses of the thorough-bred on other stocks. A description of what the English horseman esteems a good hackney may not be uninteresting. The hackney should stand about fifteen hands and an inch; he should be short and strongly coupled in the back; he should be strong and well muscled, both in the fore and hind-parts; his chest should be wide and deep, giving plenty of room for the lungs; he should have a light head, and neck carried well up; his mane and tail should be heavy; his limbs clean and bony, with pasterns somewhat oblique; his movements should be quick and elastic, and his disposition kind and tractable.

THE FARMER'S HORSE.

This is the general purpose horse, or horse of all work. He should be comfortable under the saddle, not clumsy in light harness, and should draw the plow and farm-wagon with unexceptionable success. A good, kind temper, with perfect docility, is the first requisite. His size should be about fifteen and a half or sixteen hands. He should be stout and compact, but not gross and clumsy. His weight, when in good order for work, should be from twelve to fourteen hundred pounds. His limbs should be sinewy and his feet not too small, but by no means large and flat.

HEAVY DRAUGHT-HORSES.

There are several breeds of horses in Great Britain adapted to heavy draught; but they are not now so distinct as formerly. They have all been much improved by crossing with the Flanders breed; and, by this means, breeds before much esteemed are hardly to be found, only as crossed with others.

The Cleveland Bay was principally found in Yorkshire, Durham, Lincolnshire, and Northumberland. He is a horse of considerable size, strongly made, and capable of carrying a great load at a rapid speed. The best carriage-horses are produced by breeding the Cleveland mare to the half or thorough-bred of good height and weight. Valuable hunters and hackneys are produced by the same cross with a lighter horse. Such produce have the lofty action and arched crest which are so much admired.

The Suffolk, like the Cleveland, is nearly extinct. The Suffolk stood from fifteen to sixteen hands high; color sorrel; head large; shoulders low, and thick on top; chest round and deep; back long; croup high; quarters large and strong; flanks full; legs round, and pasterns short. He could throw a tremendous weight into the collar, and activity enough to do it successfully, and sufficient endurance to stand a full day's

labor. No horse ever came down to his work with more determination. He would pull to the death. The Suffolk Punch, in much repute, is the produce of the Norman stallion on the Suffolk cart-mare. The Suffolk of the present day is a taller and finer horse, and is a cross with the Yorkshire half or three-fourths-bred. He possesses the nimbleness of action of the old Suffolk, and much of his spirit at a set-to pull.

The Clydesdale horse is larger than the Suffolk; has a better head, a longer neck, a lighter carcass, and deeper legs. He is strong, hardy, and pulls true, and is very patient. He takes his name from the district in which he is principally raised, being on the Clyde, in Scotland. He was produced by breeding the best Lanark mares to stallions of the Flanders breed.

The Heavy Black Horse.—This breed is chiefly raised in the midland counties, from Lincolnshire to Staffordshire. After coming to perfection, they are chiefly used in the city of London, to drive in business wagons. They are large, well built, and make a splendid appearance.

AMERICAN BREEDS OF HORSES.

Both North and South America abound in immense herds of wild horses. They are most numerous in the plains of South America, Mexico, Texas, and the Western territories. They are the descendants of Spanish horses, and it is stated that these immense herds sprung from one stallion and two mares, which escaped from the expedition of Hernando de Soto.

They retain very perfectly the size, shape, and spirit of the Spanish horse. They have very pretty heads and fine, clean limbs. They are not rapid in action, but capable of great endurance. They are often ridden eighty miles at the rate of twelve miles per hour, without the bit being removed. They know no gait between the walk and the lope. Many of them, captured in Texas and Mexico, have been brought into the North-western States within the last few years. They are

called Mustangs. Some of them do well for the saddle; but their wild nature frequently returns when they fall into the hands of inexperienced horsemen, and they become treacherous and intractable.

THE CANADIAN HORSE.

The Canadian horse is supposed to be of Norman-French origin. His height is about fourteen hands. His body is solid, round, and compact; the head neat, and the forehead broad; the legs are comparatively heavy, and the joints large; the shoulders and quarters are well formed and strongly muscled; the neck is heavy and surmounted by a heavy, bushy mane; the tail is strong and heavy. He is solid, compact, and strong. Many of them have excelled as trotters. Our long, tall, gangling, lathy horses would be greatly improved by a cross with the Canadian. He is longlived and a moderate eater.

THE MORGAN HORSE.

In almost every particular the Morgan horses are so remarkably distinct from other horses as to entitle them to be considered a distinct breed. The Morgan horses of this country are the descendants of a horse owned by a gentleman by the name of Justin Morgan, of Randolph, Vermont, from whom the horse took his name. The Morgan colt, as he was long called, was said to have been sired by a horse called True Briton, or Beautiful Bay. True Briton was stolen from a British officer (General De Lancy) by a man by the name of Smith. Of course, the fellow who stole the horse failed to get the pedigree. He was undoubtedly a very fine horse, and is generally said to have been thorough-bred. That he possessed a large admixture of blood is likely true. But I have always doubted his being thorough-bred. His action alone would indicate a mixture of blood. General De Lancy is said to have often amused the crowd by having him jump high fences.

Such action is unknown to the thorough-bred. The dam of Justin Morgan was of the Wild Air stock. Whatever may have been his claims to blood, his valuable qualities have been transmitted to his offspring in a surprising degree. The blood of the Morgan is perceptible after many crosses on the common stock. A description of Justin Morgan will serve as a general description for the stock. Some of the present Morgans, however, have improved on the original in many respects. Cultivation has much improved the Morgan horses.

Justin Morgan was about fourteen hands high, weighed nine hundred and fifty pounds. He was a dark bay, with black legs, mane, and tail. His mane and tail were coarse and heavy, but not wavy, as is the case with most of his descendants. His head was not extremely small, but lean and bony, the face straight, the forehead broad, the ears small and fine, and set wide apart. His eyes were of medium size and set wide apart, very dark and prominent and full of spirit; his nostrils wide, the muzzle small, and the lips close and firm. His back was short; the shoulder-blades and hip-bones were long and oblique, and the loins broad and muscular. His body was long, round, and deep, and closely ribbed up; the chest wide and deep, and the breast-bone prominent. His legs were short, close-jointed, thin, but very wide, hard, and free from meat, with muscles very large for a horse of his size. His hair was short and glossy at almost all seasons. He had some long hair on the fetlocks, and for a few inches up the back of the legs. His feet were small and round. He was a fast walker and a good trotter. He trotted low and smoothly. His action was bold, fearless, and proud, and when a rider was on his back, he was obedient to the least touch of the rein. In harness he was quiet, but full of spirit, and an eager, nimble traveler, but very patient in bad places. He never failed on a pull, and the same spirit is observed in most of his stock.

It is as roadsters and general purpose horses that the Morgan stock excel. As such they are certainly unequalled by

any horses in this country, or, perhaps, by any in the world. They have sufficient size, compactness, spirit, endurance, and action. They are fast walkers and good trotters. No other horses have taken so many premiums in our fairs as the Morgans. None bear such high prices. Many of them have excelled as trotters, particularly those of the Sherman family. As a trotter no stallion can compare with Stockbridge Chief. One of the chief points of merit in the Morgan horses is the great age to which they live. They sell in any market, bring the highest prices, and are capable of performing the greatest amount of labor. The Morgans of the present day range in height from fourteen to sixteen hands. Their weight is from one thousand to twelve hundred pounds. Their color is generally bay, chestnut, or black. But other colors are sometimes met with.

THE CONNESTOGA HORSE.

This breed chiefly belongs to the Middle States. He is descended from the Flanders and Denmark stocks. He is not so often met with now as formerly. His height is often seventeen hands. His legs are long; he is too light in the barrel, and too slow and dull in his movements. When possessing sufficient weight of body he is good for heavy draught.

THE NARRAGANSET PACER.

This breed has long been celebrated in Rhode Island. Their valuable qualities were their easy pace under the saddle, their docility and endurance. They were too small for draught. They were said to be the descendants of a horse imported by Governor Robertson from Andalusia, in Spain.

THE NORMAN HORSE.

Some of these have been imported into this country, and their descendants possess considerable merit. They are capable of carrying large loads at a rapid speed, and possess great

endurance. They are large, compact, and muscular, and in height about sixteen hands.

FLEMISH AND DANISH HORSES

Have mingled their blood with the other stocks of this country. Their descendants are chiefly found in Pennsylvania and Ohio, and the North-western States, which have partially derived their stock from the former. They are large and heavy.

THE ENGLISH THOROUGH-BRED.

No blood is so extensively mingled with the other stocks of this country as the English thorough-bred. Some of the best of the stock have been imported into this country, not so much for racing purposes as for breeding. They have vastly improved the common stock of the country. The racing stock is preserved in its purity in the Southern States. Many very fine specimens of thorough-bred horses are found in these States, and their performances compare favorably with their more favored kindred across the water. Nearly all the horses raised there have a considerable admixture of the racing stock.

Messenger was imported into New York by Mr. Benger. Though he had taken the King's plate, in England, he was kept in this country for breeding. His stock were celebrated as roadsters, rather than racers. He stood most of his time in various parts of New York. He was the sire of some justly celebrated horses, as Hamiltonian and others. His influence on the stock of the State of New York and adjoining States was very beneficial.

The Hamiltonians, the Bellfounders, the Henrys, were descended from imported horses. They were kept in different parts of the country. In almost every part of our country may be found horses with a decided admixture of racing stock. But the pure thorough-bred is seldom found in the Northern States.

We find that the prevailing character of the horses is very different in different portions of the United States. In New England we find a hardy, compact, good driving-horse, of medium size, most common. There traveling on horseback or horseback exercise is little practiced. In New York a much greater variety is found; the driving-horses have a larger mixture of the turf-horse, and are larger than in New England. The draught-horses are also larger. Quite plentifully throughout the State are descendants of Messenger, Henry, Duroc, Eclipse, and other thorough-bred horses. Nearly every stock found in this country is represented in the State of New York.

In Pennsylvania, Ohio, and the North-west, the fine buggy-horse is less frequently met with, and the saddle-horse is more common. There is great variety in the draught and farm-horses. Many of them, descended from the Flemish and Danish horses, are of huge size. In the West if the question is asked, What is the size of a horse? the answer will be given in so many hands. The weight is very rarely asked. But the rage for tall horses is fast giving way to more rational ideas. Action, endurance, adaptation to the work required, are more thought of. The horses of the West have been much improved within a few years past by the greater introduction of stallions from Kentucky and other Southern States, of more or less claims to blood. The Morgan stock is becoming quite common and much admired. Some of the best of the stock are well supported in the West. Stockbridge Chief, the best stallion in the United States, owned by Cooper, of Cincinnati, is fully patronized. The Morgans have demonstrated their superior adaptation both to the service of the farm and road in the West, wherever they have been tried.

In Kentucky and Tennessee, the saddle-horse is very common, and has considerable blood. The draught and carriage-horses of these States, as well as those further South, are generally purchased in Ohio, Indiana, and other Western States. In the States further South horses are but little used, except

for sporting, racing, the carriage, and saddle. The saddle-horses are fine, indeed, and of the imported stock. A few Arabian horses have been imported from the desert into the Southern States. From them we shall expect many genuine improvements in our horses.

BREEDING.

To all persons engaged in raising horses, the subject of breeding is of the first importance; for, unless the laws which govern reproduction be, to some extent, understood and acted upon, all efforts to improve existing stocks, or to produce horses for particular kinds of service, must depend on chance, and, of course, in most cases, prove unsatisfactory. The great law of reproduction, that "like begets like," obtains, with universal sway, both in the animal and vegetable kingdoms of nature. But every circumstance, however trifling, affecting either the male or the female, will have a corresponding influence on the offspring. Every farmer knows how mysteriously his genuine white wheat becomes degenerated when his neighbors pay no attention to keeping a good stock of wheat. And this degeneracy is only the result of the fine dust from the bloom (*called pollen*) being carried by the wind from their fields to his. As a general rule, nature endeavors to impress the offspring with the type of both parents. And we usually find a more or less perfect blending of the qualities of both in the offspring, with a decided prominence of those qualities peculiar to only one of the parents. And this does not extend merely to physical organization, but is equally true of mental characteristics, and also extends to the propagation of the diseased condition, or predisposition to the diseases, of the parents. There is scarcely a malady to which the horse is subject which is not hereditary, or to which a predisposition, at least, may not be transmitted. This is most certainly true of thick-wind, roaring, blindness, spavin, curb, contracted feet, grease, and many other diseases; and particularly of viciousness. But as the male only fur-

nishes the vivifying principle (the pollen) to the egg (the ovum) of the female, while the female furnishes the nutriment of the embryo animal from her own secretions, we would naturally expect the offspring to partake more of the qualities of the female than of the male. And this fact shows that the selection of a mare to breed from is of more importance than the selection of the horse to breed to—a truth which seems to have been almost entirely overlooked, practically, at least, in this country. For we find that farmers, as a general thing, instead of breeding their best mares, keep them for labor, and breed those which are unfit for labor on account of their age, their viciousness, or even their positively diseased condition. Hence, although very good stallions are to be found in every part of our country, at least four-fifths of all our horses bear evident marks of hereditary disease, malformation, or viciousness. Though the defects of the parents may not appear in the immediate progeny, they will most certainly be found in the second generation. From the foregoing considerations we may deduce the following important points to be observed in breeding:

First: The mare should be selected from a stock known to be suited to the purpose for which it is proposed to breed. She should be of proper age and size, well formed, of good color, proper gait, and free from any disease or malformation, or any hereditary taint.

Second: Select a stallion of good blood, but not of near kin to the mare, which will be as nearly as possible a perfect complement to the mare; by which it is meant that if she is deficient in any point, this shall be remedied by his peculiar excellence in the same point.

Third: It is more important that the ancestry of the mare should be known to be healthy and of good stock than that the same should be known of those of the stallion; for, although some mares breed after the horse, I believe that it may be truly stated that three-fourths breed after their own stock.

To illustrate more fully these principles, suppose the mare to be too fine in her limbs: to remedy this in the offspring, the horse should be even heavier limbed than desirable, but not clumsy. The dam and the sire should always be paired, their points should be well compared, so that any defect in the one may be counteracted by a contrast in the other. A breeder often puts several mares to the same horse, and by so doing seldom gets the kind of horses he intends to raise; for it can not be supposed that any man will be so careful in selecting his mares as to have them all suitable to breed to the same stallion. Farmers often pursue this course because it is more convenient to have all their breeders served by the same horse. But they pay dearly for their convenience when their best mares bring colts of the most inferior character, and fit for any thing else than the object for which they intended them. This subject demands the most careful consideration by all who would perpetuate a good stock or improve an inferior one.

Another very important point to be observed in breeding is, never to put a mare to a stallion of the same stock, if they are nearly akin; for the foal will be delicate, and seldom as good or as large as either the dam or the sire, and never as durable or as well mettled. Natural deformity may generally be traced to the fact that the dam and sire were too nearly akin. A distinguished author justly remarks on the subject of "*breeding in and in*," as it is called, that "it is a fact, however much some may deny it, that strict confinement to one breed, however valuable or perfect, produces gradual deterioration." In Europe, where the writer practiced until within the last eight years, the raiser of horses for the turf is particularly cautious of this practice. No sportsman would purchase a race-horse he knew the sire and dam to be closely related. The farmer and liveryman are equally careful on this subject. To pursue successfully the system of crossing requires much judgment and experience; for the bad qualities of the cross are easily ingrafted on the original stock, and, once there, are not, for

several generations, got rid of; and the good ones of both are occasionally neutralized to a most mortifying extent. Crossing should be pursued with great caution, and the most perfect of the same breed should be selected, but varied by being frequently taken from different stocks.

I must again recur to the very pernicious but frequent practice of breeding on infirm, small, ill-shaped, bad-colored mares, and those positively diseased, or predisposed to disease by hereditary taint—a practice which can not be too severely censured. I once interrogated a number of gentlemen who had bought, at auction, I believe, several small, ill-shaped, and diseased mares, to know why they should have purchased such, when they were certainly able to have got good-sized, well-formed, and sound ones. One of the gentlemen replied that “he knew his mare was unfit for much service, but he got her cheap, and, as he had plenty of grass, he intended to turn her to breed.” “My friend,” I replied, “your mare is better suited to any other purpose. Suppose you put her to a horse, and raise a colt, you can not expect it, at the age of four or five years, to bring more than fifty or seventy-five dollars; and, if any hereditary ailment should descend to it, it will not bring enough to pay the keeping of the dam for the six months she suckled it. Now, suppose you had taken the opposite course, and purchased a large, well-formed, good-blooded mare, free from hereditary ailment, and put her to a judiciously selected stallion, you would have stood a fair chance of raising a colt worth double the price of the former, and you would also have had the profitable labor of the mare.” Two of these gentlemen followed my counsel, disposed of their scrub mares and purchased others, and are now raising, perhaps, the best horses in their vicinity.

Another subject of importance, to which I will now call attention, is the unpardonable practice of breeding mares at two years old. This hinders the growth and spoils the form of the mare. Thus, before her constitution is matured or her strength developed, she is overladen, which crushes down her joints,

especially the fetlock, changes the natural symmetry of the body, and also has a tendency to injure the form of the back and ribs. After this burden is got rid of, at foaling, then comes the reduction on the system by the suckling of the foal. All these influences combined destroy the strength, form, and size of the mare. Besides all this, the foal comes of small size, not having had room in the space allowed by nature, and will necessarily be very delicate. It also has to be suckled by a mare that must continue to grow, and needs all that nature furnishes for that purpose. Thus both the dam and foal must be deprived of the full, natural demands of their systems, and they are both injured for all future time.

If a mare is well treated through life, allowing her to mature before putting her to breed, she will continue to bring good foals until she is twenty, and some even above that age. But if hard worked and poorly fed, so as to show the effect of such treatment, she can not be expected to bring and raise as good foals as if she had been otherwise treated.

The mare is said to go with foal eleven months, or three hundred days; but fully developed foals have been brought forth five weeks earlier than this, while in other instances mares have carried their foals six weeks beyond this time. Farmers should not lose sight of this in putting their mares; for they should have their colts come at a time when there is some grass, as the mare will do much better not to be confined entirely to dry feed at foaling. Some writers say that from the time a mare is put to the horse she may be used generally. But from this opinion my own observation and experience constrain me to dissent. I insist that she should be allowed to stand idle until the sensation of her heat, or season, as it is sometimes called, subsides. After conception, every mare, if permitted to go free, will stand by a fence or tree in a dormant position, after her heat goes off. Now, if at this time she be overworked or scared, she will cast the conception, and will require to be served again. I need not explain

the cause of this, as there is no remedy or preventive for it, only to let the mare have ease and peace, to allow nature to fulfill her allotted functions. There can be no doubt, however, that after a mare has been a few weeks with foal, moderate work will do no injury, but will rather be of service to her. She may do farm-work up to the time of foaling, but must never be placed in a situation where she will be at all likely to receive severe jolts, kicks, or any other violence. Another evil to the conception is turning mares out with string-proud, or badly castrated, horses, to be teased by these pests. This is very pernicious to their conception. On this the farmer needs no theory, as the best preventive of the evil is good fences to keep these fellows away from his breeding-mares.

To show the importance of attention to this point, I will state a few cases which have come under my observation. A neighbor of mine put a fine gray mare to a horse. She was proved on the regular trial day, and showed all signs of conception. About three weeks after being served, she stood dozing by a fence, and the owner coming up, thinking her sick, started her rather suddenly. The fright so shocked her nervous system that she sickened, lay down, and cast the embryo. Another, in the same township, aborted by a horse teasing her. I knew a gentleman who put a mare that had bred several colts; but at this time, and also the year following, she was grazed in a pasture adjoining one in which a string-proud horse was kept, and, of course, was teased by him. The consequence was, she had no colt for two years. On being asked my opinion of the cause of this, I went to see the mare, knowing that bad treatment or debility of the system must have given rise to the difficulty. (Of the latter difficulty I shall speak fully in another part of this work.) When I arrived, I ascertained the above facts. The mare was at once removed from her tormentor, and for a number of years following never failed to breed. I knew another mare to be grazed in a field back of the stable in which the horse was

kept to which she had been put. She lingered about the stable and kept her heat up, and did not conceive until removed to another field, when she immediately gave signs of conception, and in due time brought a foal.

Previous to the time of foaling there will be noticed a furrow-like fold on each side of the spinal bone extending from the tail to the haunch. This, and the increased size of the udder, or bag, are all the symptoms of approaching foaling that will be observed until about twenty-four or forty-eight hours previous, when there will be seen an adhesive substance protruding from each teat, like drops of milk. This is a certain indication, and as soon as it is observed measures must be taken to secure the safety of the foal, which will require that the mare shall be kept in a suitable place, where some careful person can look after her safety.

Recurring again to the subject of putting a mare, I would remark that the virgin mare, or one which has not for one season had a colt, is to be put when she is found in season. But the mare that has had a colt will be found in season some time in the first month after foaling, and if it is desired to breed her again, she must be put at this time. She should be put on the ninth day after foaling. Some say the eighth; but I think the ninth better. Others prefer the eleventh day; but it is dangerous to wait longer than this, for in nine cases out of ten the mare will have come off her heat, and will not receive the horse until too late for that season. The chief reason of this is, that suckling reduces the system of the mare too much to allow conception to take place, and thus a year's service of the breeder is lost. I have known many instances of this kind. I know only one remedy for this, and it is too barbarous to be practiced, and any one who would resort to it should be punished by law. After putting a mare, the days for trial are the ninth after service, the seventh after this, and the fifth after this again, making twenty-one days. Some return again, commencing with the ninth day, and follow up

as before, making forty-two days. But I insist that, as twenty-one days is the period elapsing between a mare's going out of heat and coming in again, making her periodical term thirty days, twenty-one days is sufficient to prove a mare.

Every breeder should be able to judge of the conception of a mare, which will require attention to the following points: After the first service of the horse, and before the next trial, on examining the vagina, or bearing, as some call it, if conception has not taken place, it will be of a fresh, bright, or florid and moist appearance, with a clear drop appearing at the lower part, and which, if touched, will incline to extend; but if conception is present, a different appearance of the surface of the vagina will be presented. It will be found dry and of a dirty brown or rust color, and a dark, brown-looking drop will replace the former clear drop. When these latter appearances are present, pregnancy may be regarded as certain. They may be relied on as a sure criterion in the purchase of a mare alleged to be with foal.

Strange as it may appear, some mares, even though with foal, if teased at about the expiration of the first month, or part of the second, will be induced to admit of the service of the horse. I have frequently seen this proved. The author once put a mare to a horse in May. She stood every trial. In harvest—or in September, I believe—I rode her by the stable in which the horse was kept. She forced toward the stable. I took her there and found that she stood the teasing, and should have let the horse serve her; but the groom not being at home, I was unable to do so. Subsequently, I deferred putting her on account of the lateness of the season. This mare proved to be with foal, and brought a colt early the following spring.

Especial care should be taken of a mare about the fourth and fifth months of her pregnancy, and from this time forward. It is about this time when abortion is most likely to occur. Her feeding should be increased, as she can not endure hun-

ger. She has peculiar need of additional feed, as the rapid growth of the embryo is a material tax on her system, calling for an increased quantity of nutriment. There are two animals to support on the food of one. This must not be overlooked, or abortion will often be the consequence. Another cause of abortion, which I will mention, is showing a mare food which she likes, and has been in the habit of eating previous to this time, and not letting her have it. Seeing or even smelling such food is dangerous. I saw a mare taken to a mill in the month of November, and hitched on a floor near a heap of bran, which she tried very hard to reach, but could not. Soon after being taken off the floor, she took sick and had a visible appearance of abortion; but a veterinarian who was present, and had seen the whole transaction, took some of the bran and fed it to the mare, and the spasms, or throes, left her, and never returned again until the full term. I have known other similar instances. Feeding hogs by the place where mares not grain-fed are kept, is ultimately dangerous.

If a mare once slinks her colt, she will be very likely to do so at the same period of her pregnancy the next year, and continue the habit, especially if any thing like the same provocation occurs. But if she slinks, or aborts, from a hurt, a strain, or some disease, she will not be so liable to continue it as a habit. The best remedy I have ever found, when a mare shows symptoms of abortion, is to take the feathers of wild birds, (pigeon feathers are the best), and burn them on a hot pan, or iron, holding them so that she can inhale, or breathe, the smoke.

If a mare is in the habit of slinking her foal, she should not be kept in the same lot with other breeding-mares; for, though it may seem very strange, the act of one mare slinking will be almost certain to cause the others to do the same. This is the result of sympathy—some writers say of imagination. But I rely for its explanation on that great sympathy whose delicate and mysterious chain binds not only the differ

ent organs of the same animal, but reaches out even to others of the same species, or even of different species, particularly if in close contact, so that an impression made on one does not stop with itself, but finds a response in the others. The nervous system is the medium through which this sympathy acts, and as this is always exalted in its sensibilities during pregnancy, we might reasonably expect such a result as abortion from sympathy. Imagination, indeed, may produce abortion, but by an entirely similar impression on the nervous system to that produced by fright. Hysteria is a disease of a nervous, spasmodic character, generally resulting from the sympathy of the uterus, or womb, with other organs, especially the stomach. The nervous system here is the medium through which the morbid impression is transmitted, and this peculiar organ is susceptible of being affected even by mental impressions.

An acquaintance, a large breeder, had several mares slink their foals the same night. I have read of several similar instances. These cases, which fell under my observation, were caused by the owner purchasing a mare in the habit of slinking. The first year, at Christmas, she and three others aborted; and the next year five. The third year, the habitual aborter was separated from the others and followed her usual habit, but all the others went to their full term, as they did ever after.

RAISING.

Under this head I shall treat of the management of the colt from the time it is foaled up to the time it is taken up for breaking, or training. There is but little to be said on this subject, though there are very important matters involved in it. After the colt is foaled, the mare should be allowed to stand idle for three or four weeks, until she comes to her milk. She also needs rest to allow her carcass to resume its proper shape and strength, which must necessarily have been considerably weakened by carrying the foal and foaling. The

foal is also tender, and needs time to allow its limbs to acquire proper shape and strength. It should have as little traveling as possible to do; though it should be allowed to run with the dam on the farm, so that it may draw the milk often, which will increase the quantity, as well as enable the colt to get it while fresh, which is much more wholesome to it than stale milk. Though the colt should be allowed to run with the dam on the farm, it should not be allowed to follow her to market, or other places, over hard roads, for in this way it will be very apt to start impediments, such as ring-bone, spavin, hoof-bound, curb, or splint. How these are produced I shall explain when treating of them respectively.

There is no period of a horse's life at which bad treatment will have so injurious an effect as at this. And what is here lost by carelessness or neglect can never be regained by any subsequent good attention. If it is desired to have a good, stout, well-shaped horse that will attain his natural growth, both the dam and colt must be well fed and protected from foul weather and severe storms. The proof of the old adage, "half stock, whole profit," is here realized. Nothing is ever made of any stock by starving, and much less of the horse than any other animal. Where shape and performance, or durability and action are required, if the young colt get a start by good feeding and care, it will be easy to keep him up until his training, at three or four years old, when his superior qualities will abundantly repay all former trouble. If poorly fed and illy used, there is seldom any thing made.

At five or six months the foal may be weaned, if its size and strength are such as to indicate that it is able to do without the milk. It should be put away in a distant pasture, where it will have no opportunity of seeing the dam. It must now be closely looked after, so that it may be well prepared to begin its first winter. Oats and bran should be allowed in liberal quantity. It would be better to have the oats bruised. Generous feeding is the true principle of economy in this case.

But the colt should not be rendered delicate by too close confinement or stabling. He wants the free use of his limbs out of doors to develop their strength, and the free access of air into the lungs to properly ventilate his blood. This, too, is the most suitable time to commence the cultivation of that attachment to and confidence in man which gives rise to that implicit obedience which characterizes the horse above all other animals. Harshness and cruelty at this period are particularly injurious. The colt should be frequently handled by those feeding him, and even tied up, after becoming habituated to being led about by the halter. Early impressions on the horse, as well as on man, are the most enduring.

The proper time for castrating a colt depends to so great an extent on the purpose for which he is intended, his shape of neck and head, his breed, etc., that any one age can not be put down for this operation; though, from the practice of our farmers, one would suppose that it is a matter of no consequence at what age the operation is performed. A description of the mode of performing the operation will be found in another part of this work. As a general rule the age of four or five months, for the farm or general purpose horse, will be found proper. But some regard should be paid to the weather, which should not be too hot, nor the flies very numerous. A horse intended for heavy draught or the carriage may generally be castrated at the age of one year, but if too light in the withers, inclined to be ewe-necked, his form will be materially improved by not castrating him until the fall, after he is a year old. But if a colt shows too large a head and is too heavy in the jaw, the earlier he is castrated the better.

Some young horses are found to have crooked pasterns. This difficulty commences to develop itself at one year of age. It is caused by the side of the hoof growing thin and extending to one side. Generally, if the hind-hoof, it extends to the inside, but if the fore-hoof, to the outside. When the pastern is thrown outward, it is called pigeon-toe; when inward, it

is called officer-toe. The extending inward of the hind-hoof is called dish-hoof.

This difficulty can be remedied by turning up the foot, and paring down and thinning the side which extends too far. But if this does not answer the purpose, put a half shoe on the side toward which the pastern inclines. This will throw the pastern in its proper position, and correct the difficulty. I have often succeeded by these measures in bringing the hoof straight, and, consequently, prevented a crooked pastern in the growing animal. The foot will most certainly be distorted if this difficulty is neglected.

TRAINING, OR BREAKING.

This is an art which most persons attempt, but in which very few succeed, for several reasons. First, they do not approach the unhandled horse rightly. Second, when they do approach him, it is generally in such a way as to make him worse than before. Third, they do not know how to tie the horse in form for snaffling, as it is called in England, but in this country, breaking. But there is really a great difference between snaffling and breaking. The latter refers to the bringing of the horse into subjection from the state of nature, while the former refers to teaching him the use of the bridle for the purpose for which he is intended.

I shall now attempt to explain how a young horse should be approached. And I can not too strongly urge the importance of gentleness and kindness in this first attempt to bring this interesting animal to recognize the dominion of man. Man's superiority consists rather in the superiority of his moral powers than in physical strength. Indeed, in the latter he is but a feeble antagonist for even the horse. Some will approach a horse with a whip in hand, as if to chastise him, or scare him into subjection. But when the untamed horse sees a man coming upon him armed in this manner, his first impulse is to save himself by flight; but

if this can not be effected, his next reliance is battle, or fight, and he becomes the more desperate as he has an instinctive idea of the superiority of man.

"Self-preservation is the first law of nature," and the horse is not less sensitive to its impulses than man, and arouses all of his energies for defense even against the approach of apparent danger. At the same time the horse is taught man's superiority and obedience to him, he must also be made to know that he is a protector and defender, and not a tyrant over him. If any unhandled horse is not of a vicious disposition, and very few are until made so by bad treatment, but little difficulty will be experienced in approaching him. First commence by feeding him, and talking to him, and gently handling him. He will very soon become sufficiently docile to admit the halter, or even the bridle, to be put on. But if the horse is of an excitable or vicious disposition, the following plan will succeed the best, and, if firmly pursued, I think will be found equally effectual in bringing into subjection the vicious animal, with the different systems which, in the hands of some individuals, have acquired such celebrity, and has the advantage over other plans of taming, that it may be practiced by any person who has only nerve enough to not betray any expression of fear to the animal, though he may never before have even seen the plan pursued in a single instance. I have seen the most vicious animals completely subdued in a few days by this plan. One splendid mare, eight years old, which had baffled the most successful trainers, was purchased by myself for forty dollars; and though it was regarded extremely dangerous for any person to even enter the door of her stable, she was rendered perfectly submissive in three days under this system, and is now, as she has been ever since, entirely free from her former vicious disposition.

The following is the course to be pursued. Having the horse loose in a stable, take a narrow board or hoop-pole, and, enter-

ing the stable with an expression of confidence and determination, commence striking the sides of the stable, the lofting, and the rack, if any, making considerable fuss. By this means you show the horse your power over him, and that resistance or fight on his part would be useless; and, consequently, he will not attempt it, but will stand as close to the wall as he can get, keeping his head as far off as the wall will permit. Now strike the wall over him, and as near to him as possible. You will very soon find him begin to look for sympathy or friendship, and, when you see this, be sure to show mercy. Lay the pole lightly on him any place back of the withers, and rub him back toward the tail, being careful neither to rub too lightly nor yet so heavy as to make him think you are doing it to hurt him. Continue to rub him until he looks friendly. But if he refuses, make more passes, and then rub him again; in a short time he will throw off his obstinacy and be less scared. Next time use a shorter stick. Pretty soon you will find that you may pat him on the neck; and after this is allowed, rub him under the breast, belly, and flank with the hand. After this you can use a clapboard, one about four or five feet long, following the same course as before. The next thing you wish to do is to put the halter on him. This you will accomplish in the following manner: Press over his head, and when he lowers it for fear of being struck, hold your hand as high above it as you can, and keep raising and lowering your hand until it touches him, but do not keep your hand on his head, until you see his willingness to allow you to do so. When he refuses, resort to the board again. By patiently persevering in this course he will soon allow you to put your hand on his foretop, which you should pull and rub, so as to familiarize him with having it handled. This course is to be pursued with great patience until you think him sufficiently submissive to allow the halter to be put on. Before venturing on this, rub a little oil of rhodium on your hands and clothes, and wear no other clothes until the horse is haltered.

After thus bringing the horse to submit to his master, he is ready to be tied up for snaffling; and when this is done, he may be properly gaited.

SNAFFLING.

This, as before remarked, is the art of instructing the horse in the use of the bridle-bit, to suit the purpose for which he is intended to be used. It has two leading objects. The first is to accustom his mouth to the use of the bit, securing the proper degree of tenderness, and giving him a knowledge of the object of the different positions and motions of the rein. The second is to give the neck and head the right position. This practice, although almost entirely neglected, or unknown, in the greater portion of the United States, is a very necessary part of the horse's education. In Europe, a horse worth three hundred dollars would not sell for two hundred and twenty-five, if not snaffled and gaited. Indeed, so necessary is this regarded there, that a great many men follow this branch of training as a distinct avocation, and find it a lucrative employment.

If a horse is intended for the carriage he must carry a high head; the saddle-horse, not so high, lest the froth from his mouth should soil the rider's clothes. The courser and hunter must keep his head lower still, so that he may be able to see where to place his feet. Now, if all this is necessary, which none will doubt, is it not well to know how to secure these objects?

For this purpose, it is necessary to procure a bridle with a mouthing-bit. The mouth-piece should be, at least, from three-fourths of an inch to an inch bar, also a surcingle. The back-strap of a buggy-harness would do, but the turrets are too high up. The turrets should be placed at the round of the ribs; and to the surcingle a crupper must be attached. This simple rigging put on, if it is intended to prepare the horse for the

carriage, run the reins through two rings suspended from the throat-latch, and pass them over the hook, or turret, at the top of the surcingle, making the reins short enough to elevate the head to the position required.

If for a saddle-horse, pass the reins through the turrets at the sides, not passing them through the rings at the throat-lash, and unite them by a strap, or cord across the neck, just forward of the withers. By this the position of the head can be regulated—made either higher or lower, as may be required.

If for a racer or hunter, use the latter arrangement, with a martingale to keep the head down. In either case, let the horse move around three hours each day in the stable or yard. This is done to let him champ and make the mouth tender, and to accustom him to the constrained position of the head and neck. After the mouth has become somewhat accustomed to the bit, a cavezon is put on, and the horse is by this taught to turn. This consists of a loop of iron to pass around the nose, with a ring on each side of the mouth, and a projecting turret, four or five inches rising from the front of the nose; at its end is a ring. It is held on by a headstall and by a strap at the back of the chin, by which the two sides are united. By this strap it can be tightened or loosened.

The rope or rein is first fastened in the ring in the turret in front of the nose. Then the horse is made to turn, first one way and then the other, and run around in a circle, and so on, until he becomes accustomed to turning. After some time the rein may be put in one of the rings of the cavezon at the side of the mouth, and the horse exercised as before. This operation is called allonging the horse. After this, two reins may be used, the trainer standing behind the horse, and he may be taught to move forward, turn sidewise and back. After this the horse may be backed, and accustomed to the use of the rein in the hands of the rider. And here will be required a trainer who understands his business, or former labor will amount to but little. If the horse is for a hackney, his head

must be held constantly in the proper position for that particular service. The same, if for any other purpose. Many days will be necessary to teach the horse the meaning of every motion of the rein, every pace required, and to constantly submit to the weight of the rider's hand. I can not give in this work minute instructions on gaiting horses, but would remark that every fine horse should be properly trained and gaited to enable him to appear to advantage.

FEED AND FEEDING.

The diet of the horse is very simple, and confined to a very few articles. But it admits of sufficient variety to enable the owner, in any part of the country, to supply his horse feed from the productions of the district. The most important articles of the horse's diet are the farinacious or starch-yielding grains. Among these are oats, Indian corn, beans, buckwheat, wheat, and barley. Certain roots containing starch and sugar are sometimes used as articles of the horse's diet, such as potatoes and carrots.

Various grasses and herbs are eaten by the horse in their green state. They constitute what is called green feed or green meat. Certain grasses and herbs are cut when they reach a proper stage of ripeness, cured, and put up for future use. This is called hay. The principle articles used as hay in this country are timothy, blue-grass, clover, and red-top. The nutritive qualities of these articles depend on the same principles, whether used dry or green. Their nutritiveness depends mainly on the sugar they contain.

Whatever may be the food given the horse, its mode of preparation will have much to do with its effect in sustaining him. A diet containing but little nutriment may be so given as to do as much good as a much more nutritious diet carelessly given. Cheapness is an important object, to those who have to buy their feed especially. To attain this end the feed should be so prepared and so given that every particle of nu-

triment may be extracted from it during the process of digestion. In the ordinary ways of feeding, a large part of the food passes through the bowels without losing its nutritive principles at all. In this way a great waste is sustained, and the horse's digestive organs impaired.

I shall now consider the principal articles of the horse's feed, and the best methods of preparing and using them.

Oats.—Oats stand at the head of the list of the articles of the horse's feed. Shelled oats contain about seven hundred and forty parts of nutritive matter to the one thousand. They are easy of digestion, healthy in their effect on the system, improving the condition generally, and enabling the horse to perform his work without injury to his health or spirit. The ordinary method of feeding oats is to give them in the grain, moistened with water. They are sufficiently digestible in this way. The quantity required per day for a horse of ordinary work, with proper allowance of hay, is about sixteen pounds a day. The allowance, or ration, of the United States cavalry horse is twelve pounds of oats and twelve pounds of hay. Cut oats is very good for a horse not working. The straw of oats contains but very little, if any, nutriment.

Corn.—The common Indian corn is very extensively used in the West as an article of diet for the horse. It contains, in one thousand parts, six hundred and fifty parts of nutritive matter. It is a very nutritious food, but alone is too stimulating. It may be safely used in winter, and especially with horses that are worked hard. The meal, used with chopped feed or oats, is good under any circumstances. Indeed, it would be the best and most economical at all times to have the corn ground. None of its nutriment is then lost. Corn-meal gruel is very good for horses recovering from severe sickness.

Beans.—Beans may be fed to the horse alone, or ground up with other food. In the one thousand parts they contain five hundred and seventy parts of nutritive matter. They are a

very invigorating article of diet. They are very stimulating, and are also astringent. The use of beans alone would cause inconvenient costiveness. It would pay well for our farmers to give more attention to the culture of beans for feeding purposes. Two pounds of crushed beans a day added to the horse's feed during the winter will greatly increase his strength and endurance.

Peas.—These possess similar properties to beans. They are not quite so stimulating. They should be crushed. They contain, in one thousand parts, five hundred and seventy-four parts of nutritive matter; but, like beans, this is by no means the standard of their invigorating and sustaining quality. They are much more valuable as an article of feed than this would indicate. Given whole, peas may do mischief by swelling in the stomach.

Buckwheat.—In some parts of this country, buckwheat is ground with other feed, and is considered very nutritious and healthy.

Wheat.—The better part of the wheat flour is too expensive for horse-feed. It is only the shorts and bran that are given the horse. Shorts are mild, non-stimulating and nutritious. Mixed with cut or chopped hay, shorts are valuable feed. Scalded shorts are often recommended as the first feed after recovery from sickness, and also during sickness. They seem to have a laxative effect on the bowels. Bran is not so nutritious as shorts, but mixed with cut hay is very much relished, and makes good feed.

Barley.—Barley contains 920 parts of nutritive matter in the 1000. It is the common food of the horse in some parts of the continent of Europe. It is very stimulating and laxative. It might do for horses that work hard. It should be bruised and given with cut hay. Boiled barley is a good laxative. When a horse is on the use of the flax-seed jelly for the purpose of fattening him, he should have a feed of four or five pounds of well-boiled barley every week or ten days.

Potatoes.—Potatoes contain 230 parts of nutritive matter to the 1000. They are given raw and sliced, in cut feed, but they are best boiled or steamed. Many horses will thrive and work well on boiled potatoes. It is best to give them in mixed feed.

Carrots.—This root is regarded as promoting the strength and endurance of the horse in a high degree. It is much esteemed as a feed for sick and convalescent horses. In health, carrots may be given sliced in cut feed. Half a bushel a day is sufficient, if other strong feed is not given. Boiled carrots are given to sick horses. Carrots are much used in feeding racing and other sporting horses. They greatly improve the horse's wind. More attention should be given to their cultivation.

Hay.—Timothy is by far the most extensively used as hay. It contains all the properties necessary in hay, and is easily cured and put up. It is one of the most important agricultural products of this country. It should be cured without any rain falling on it after it is cut. It contains near 100 parts of nutritive matter to the 1000. It is not so much on the proportion of nutritive matter it contains, as on its peculiar adaptation to the horse's digestive system, that its value depends. The quantity of hay given to the horse should be regular, as that of the oats or corn. The habit of giving a large quantity one day, and but little the next, is very injurious. It begets bad habits in the horse. The rack is a good way to give hay, if properly made. It is not spoiled by the horse's breath as when given him in a manger. The dust is also shaken out of it by drawing it from the rack. It improves the carriage of the young horse's head to have been accustomed to reach up for his hay. Cut hay is the best article to give. Bran, shorts, and ground feed, with blue-grass, red-top, clover, rye-grass, and the prairie-grass of the West, possess nearly the same properties of timothy, and may be used in place of it for hay. Whatever grass is used for hay should be well cured and put

up without rain. If hay is salted as it is put up, its digestibility and palatableness will be much improved. Mowburned or molded hay is very injurious, and should not be given the horse. Any kind of hay will do to cut for chaff to give meal, shorts, etc., with. Even straw is better for this purpose than to feed the horse on grain alone.

The blades of corn, pulled and cured in the summer, are superior to any of the grasses for hay. They are the best article that can be given the sporting-horse or the stallion. It will pay well to pull them when the price of hay is high, or to feed valuable horses.

PREPARATION OF FOOD.

The feed of the horse is usually given with no other preparation than that necessary to take care of it. And when we see that horses perform all manner of work with ease and success fed in this way, we naturally become skeptical on the theories we often see put forth in advocacy of more artificial systems of feeding. The horse's digestion is very powerful, and when healthily performed, needs but little assistance from art.

The feed of the horse may be cut, boiled, bruised, steeped, steamed, and even baked. Hay and straw are often cut, and there are many advantages claimed for cut feed over the common way of feeding. In some particulars these claims are doubtless just. I shall only mention a few advantages of cut feed. The cut hay or straw is always mixed with the grain; the hay is given in quantity and manner that the horse is not so likely to waste it; the grain given with the chaff is better chewed than when given alone, and, consequently, is better and more easily digested; old horses can grind their feed better when given as chop-feed than the common way; the horse is not so apt to eat his feed too fast when the grain is mixed with the cut hay; hay or straw which would be scarcely eaten by the horse is readily taken when given as chop-feed. For fur-

ther discussion of this subject, consult the various agricultural journals. Bruised or crushed grain is given with a view of its being more easily and perfectly digested. It is also preferred by the horse. Boiling and steaming are for the same purpose, generally. The properties of some roots are changed by boiling, making them agree better with the horse; as turnips, potatoes, artichokes, etc.

Hay tea, made by steeping hay in hot water, and closely covered until cool, is an excellent, nutritious drink for sick horses. It would doubtless be of advantage to horses of quick action when tired and hungry.

Seasoning.—The only article of this class necessary is *salt*. The horse should have salt once a day. It is a very good plan to give it in his soft feed, or even in meal. Some prefer the rock-salt, but I apprehend it has no superiority over the common salt.

Niter (saltpeter) is often given the horse, but it is not only useless, but even injurious. In some countries, pepper, ginger, or other stimulants, are often given the horse. They may be valuable in very warm climates, but are not necessary in ours.

Time of Feeding.—Most persons have their times for feeding arranged to suit the business they follow. The farmer feeds three times a day, and this is the least number of feeds the horse will do well on. Others feed oftener, but the quantity of provender used is about the same per day if the horse is fed three or six times.

Water.—Many lengthy discussions have been indulged in on the subject of watering. Many conflicting opinions have been advanced. Men of observation do not seem to conclude alike in all cases. Undoubtedly the watering should depend, to some extent, on the use for which the horse is intended. If for quick action, his watering should be so arranged that he may never be put to his work with his secum full of water, for his wind may be injured by it. But that he should have water as often as he becomes thirsty seems but the deduction of com-

mon sense. How he should be watered is a different thing. It may be given not quite cold, and in but a sup or two at a time, the horse being somewhat rested before giving it. I speak of the hackney and carriage-horse, leaving the watering of the racer and sporting-horse to sporting men. The principal waterings should be before feeding, as much or more than half an hour. Neither man nor horse should drink cold water until satisfied when parched with thirst. It should be taken with the chill off and in small quantities, repeated at intervals, or not taken at all until the feverishness of thirst has subsided. It might be proper to remark that by habit the horse may learn to pass the hot days of summer on but a few draughts of water. It is not so important to the horse of slow work not to drink largely, provided his system is in proper condition not to have inflammation brought on by drinking. Nothing is more injurious to the horse than the want of sufficient water. If the horse has fresh water constantly in reach, I think he will never be found to be injured by it. It cools the undue heat of the system, and rapidly dilutes the blood. It is nature's febrifuge—the best fever medicine in the world. The horse should be slightly exercised after drinking, to prevent the water from chilling the bowels.

The evil effects which result from drinking cold water when the horse is hot are spasmodic colic, founder, rheumatism, and indigestion. These effects are more likely to follow if the horse is getting cool when the water is given, than if given when he is at high heat. If the horse is briskly exercised as soon as done drinking, these effects will be avoided. If after drinking the horse is observed to shiver and the coat stare, or the sweat rapidly dry up, evil may be expected. A table-spoonful of ginger, a tea-spoonful of saltpeter, and a little whisky may be given to prevent the threatened attack.

CONSTRUCTION OF STABLES.

Much of the horse's comfort and usefulness depends on the condition of his stable and stable management. Proper stabling is as necessary to his health and ability to labor as comfortable housing is to man. In constructing stables, three objects may properly be considered—cost, convenience, and healthfulness. I shall present a few hints on these subjects, more with a view to calling attention to their importance than giving a model to be followed in the erection of stables. The man who, through neglect or stinginess, fails to provide comfortable stables for his horses, is guilty of a crime which merits the contempt of all humane people, if not the punishment of the law. It is cruelty to man's best servant.

The cost of a stable may be very considerable, or a very small outlay only may be necessary to erect a comfortable, healthy, and convenient one. Stables may be stone, brick, or frame buildings. In this country frame stables are the cheapest and most common. The frame should be heavy and strong, and placed on a firm rock foundation. It should be sufficiently raised from the ground not to furnish a harbor for rats.

The principal door should face to the south, and a dry lot, of considerable size, should surround the stable. The weatherboarding should be an inch thick, jointed, placed perpendicular, and the joints covered by strips. The inside of the stable should be ceiled up to the joists. The upper floor should be laid close, so as to prevent dust and hay-seed from falling through on the horses. The floor should be laid with two-and-a-half-inch boards, closely jointed. The part of the floor under the stalls should be laid of oak boards. They should be placed so as to run from the front to the back of the stalls, and the front should be about two inches and a half higher than the back. At the foot of the stall a gutter should be made so that the water will run off, and not stand in puddles at the horse's heels. The depth from the gutter to the front of the stall should be about nine feet. The partition between

the stalls, called the travis, should be made of inch-and-a-half or two-inch boards, closely jointed. The length of the travis may be from five to nine feet, the latter being preferred, as it more effectually prevents the horses from kicking each other. The height of the partition should be about seven feet at the head and five at the heels. The travis is supported by two posts, one at the head and the other at the heels. The heel-post should be round, or have the corners rounded. The posts should reach the joists above. Some have the heel-post only as high as the partition. The posts should be firmly placed, so the stall may not give way.

The proper width for the stalls is about five and a half or six feet. It would be well to have one partition so constructed as to be easily taken out, to throw two stalls together for a horse-box for a sick horse.

The feed-trough, or manger, may be made of wood, but an iron one would be better. The common low manger is very inconvenient, and affords great opportunities for wasting. The wooden manger is generally made long enough to reach clear across the stall. This is longer than necessary. Thirty or thirty-six inches is long enough. It should be one foot broad and ten or eleven inches deep. The manger should have no rough or sharp edges for the horse to bruise or cut himself on. A ring is generally attached to the manger, to which to fasten the collar-rein. This should be placed about nine inches from the partition. The top of the manger should be about three and a half or four feet above the floor of the stall.

The hay-rack should be placed in the opposite corner from the manger, if a side rack is used. The front rack, of course, extends the width of the stall. The front of the rack should be perpendicular, and the back so inclined that the hay will all the time be in the horse's reach. Recesses afford the best opportunity for properly constructed racks. If the rack is much slanting, it is difficult for the horse to get the hay, and the eyes are more exposed to getting hay-seed in them. The

lower edge of the rack should be about eighteen inches above the top of the manger. A rack that will hold twelve or fifteen pounds of hay is large enough. The rack may be filled from an opening from the loft above, or it may be placed so as to be filled from below. The rack may be made of wood or iron. It should be well secured, so as not to be dragged down by the horse.

The gangway behind the stalls need not be more than seven or eight feet wide, which would give the width of the stable about sixteen and a half or seventeen feet, inside measure. If several horses are to be kept in the stable, it should be a foot or two wider, and particularly if boxes or chests for holding feed are kept below, in the gangway.

The doors should be strong and wide enough for the horses to pass out without striking the door-posts. The doors may be all in one piece, or, what is better, in panels, so that the upper part of the door may be left open, and the lower part shut. A catch, or latch, should be so fixed as to hold the upper panel of the door when it is opened. There should be two doors, one at each end of the gangway. This affords a good opportunity for airing the stable.

The windows should be so placed as to admit light enough that the ordinary work in the stable may be done without opening the doors. They are generally placed along the side opposite the stalls. They should have shutters so that the stable may be darkened if necessary, which is often the case when the horses require sleep in the day-time. It is often said that enough air enters the stable through the cracks in the doors and other apertures; but this is not the case if the stable is tight enough to be sufficiently warm in the colder weather. In summer a door or window may be left open, if there is no danger of ill-disposed persons; but an arrangement should be made to admit fresh air at all times. This should be admitted close to the horses' heads, and close to the floor, but not so as to strike them in a current. A long box, about a foot square,

extending from one end of the stable to the other, under the mangers, and open at each end to admit air, and perforated with holes in front of each stall, will answer the purpose well.

It is quite as important to let the bad air out as fresh air in. To effect this, a box should extend up through the loft and out at the roof, like a chimney. Its open mouth should be just below the joists. It should be about a foot square, and covered at the top, to prevent rain and snow from falling through it. One of these should be placed over each stall. The impure air rises to the upper part of a room; hence the propriety of having openings above for it to pass out.

The upper chamber of the stable or hay-loft may be of any size the owner may deem necessary. It may only have room for hay, or it may be arranged for containing straw, grain, bran-
chest, and cutting-room. It is not necessary that it should be so close as the lower story.

If the grain is not kept in the hay-chamber above, a bin or crib should be convenient to the stable. The straw for bedding is often kept in a vacant stall.

I regard a harness-room as an essential appendage to every stable. Harness, saddles, brushes, whips, etc., can not be properly taken care of without it.

There should always be an out-shed in which to clean the horses.

A chamber, with a boiler for heating water, boiling roots and grain, is an admirable convenience. A well of water is almost a necessary in a stable. The water-bucket is at once the simplest and best for watering the horses.

By observing these principles, a comfortable stable of any size and almost any cost may be constructed, and suited to any American farmer or horseman.

STABLE OPERATIONS.

In this article I shall endeavor to point out those attentions which the general purpose or farmer's horse should have, in

order to preserve his health, secure his comfort, and render him most useful. I shall not endeavor to describe the many operations which the regular groom is accustomed to perform on the fine sporting-horses or valuable stallions. Few of our farmers can afford to keep even one groom to attend their horses; but a small amount of time can be devoted to the horses each day. Justice and humanity to the horse require that he should receive more care than is often bestowed on him.

Bedding the Horse.—Straw is generally used for this purpose. It may be kept in an empty stall, the loft, or any place where it can be conveniently reached. After the horse is removed from the stall in the morning, the dung and wet straw should be taken up and thrown out on the dung-heap. The dry straw may be thrown forward under the manger. When the horse is brought in at night, the bed is made down, using enough fresh straw, so that with that left dry the previous night a comfortable bed from six inches to a foot deep may be spread for the horse. This should be spread even and smooth, so as to leave no lumps under the horse when he lies down. Good bedding should never be neglected; it takes but little time, and is of the greatest advantage to the horse. The habit of letting the horse lie on a heap of dung from week to week, or even longer, is cruel and injurious, and has no excuse except in ignorance or laziness.

Grooming refers to those operations which have for their object the cleaning of the horse. But the duties of the groom are generally made to embrace much more. The farmer is usually his own groom. The essential tools for cleaning the horse are the curry-comb, the brush, and wisp or wisps of straw. Many others may be used, as sponges, combs, towels, skins, rubbers, scissors, bandages, pails, forks, brooms, etc.

Dressing before Work.—Before the horse is harnessed for the day's work, he should receive such a dressing as will clear the coat of any dust or dandruff in it, and excite the skin to a pleasant glow, so that the insensible perspiration will go on

freely during the day. This is effected almost entirely with the brush, which is taken in one hand, the curry-comb being held in the other. The face and muzzle are first brushed, and then the neck, shoulders, body, and quarters, and then the legs. The brush is frequently brought across the teeth of the curry-comb to clean it of dust. The brushing should be continued until the coat is perfectly clean. The legs should receive particular attention, and always a good hand-rubbing or rubbing with fine straw. The mane and tail may be carefully untangled and brushed, or combed with a coarse horn-comb, used for that purpose. A wisp of straw may last be used to polish the surface.

Dressing after Work.—During the day's labor the horse may sweat frequently, and the hair become much stuck together by the sweat, dust, and dandruff, or he may become very muddy, especially his legs. In this case, the operation of cleaning is more laborious, and should be performed as soon as the horse is brought in, or as soon as he is cooled, if he has been very hot.

The use of the curry-comb is not so much for cleaning as for scraping the dust out of the brush at every stroke or two. It may be used when the hair is stuck together by sweat and dust, to raise and separate the hair and prepare it for the brush, and for loosening dried dirt; but on the legs it must be used very gently for this purpose. The brush is to be chiefly relied upon for cleaning the dry horse, but hand-rubbing the legs, face, head, and ears must not be neglected. If a horse is brought in, in a "lather of perspiration," and hot, he should be walked until cool, before being put in the stable. The sweat may then be scraped off, and the horse rubbed with wisps of straw until dry. This exercising and rubbing prevents him from taking cold. The legs, especially, should be well dried.

If the horse is very muddy, he is often washed to take off the mud. Some ride him into a stream for this purpose. Others use a sponge and washing-brush. Many are much

opposed to washing the mud off the horse at all; but it is certain most persons will do it despite all arguments against the practice. I can see but little danger in washing, if it is properly done. I can see no more danger from moving a horse briskly for a few seconds, or, at most, one minute, in a stream of water, than from riding him for one or more hours through the cold mud and slush, where it is dashed against his legs and belly at every step. The horse should not be kept in the water longer than the time above referred to, and should be moved briskly in it. He should then be moved around for some time on dry ground, and then have the parts washed rubbed dry. The legs and belly, especially, should be well dried.

To wash the horse, a large sponge, a washing-brush, and a bucket of water are necessary. The operation should be done very quick, not exceeding two or three minutes. The water should be slightly warmed. The horse should be exercised and rubbed, or rubbed dry, as above described.

When a horse is brought in out of the rain, all wet and muddy, if he is immediately sponged off all over, and rubbed dry, or nearly so, and then blanketed, and his legs dried, I scarcely think any harm can result from the operation, especially if his stable is warm and he has a good litter to stand in, and if the water has been slightly warmed.

The principle to be kept in view is to so manage the cleaning and drying of the wet, or muddy, or sweating horse as not to chill his general system or any part of his body, as the feet, legs, or belly. Such chilling may bring on founder, lung-fever, pleurisy, cold, bronchitis, grease, scratches, etc. The danger is very considerable.

The horse should never be stabled while very warm; he should be kept moderately exercised until cooled—best told by noticing if the pulse is down to forty beats per minute. The heat of the skin may show with sufficient accuracy.

Attentions to the Feet.—The shoes should be frequently ex-

amined to see that they are all right. The feet should be examined every night to see that no gravel or sand is insinuated under the shoe so as to bruise the sole.

Stopping the Feet consists in applying some moist matter to the sole to keep it soft and elastic. Only the fore-feet are stopped. The common stopping is either cow-dung or clay, or a mixture of both. Other substances are used. If the sole is dry and stiff, the feet may be stopped from one to three nights during the week. The condition of the sole is the only rule. Farm-horses generally require no stopping. It would be well to stop the feet the night before the horse is to be shod.

Oiling the Hoof is generally a useless practice. It does no permanent good even to the brittle hoof. (For a further consideration of the feet, see the article on the "Horse's Foot.")

PREPARATION FOR A RACE.

To show the reader the amount of attention it is necessary to give a horse to develop his highest powers, I will give the proper method of preparing a horse for a race. Similar preparation, in some respects, may be necessary for horses designed for other severe service. The principles involved in the preparation for a race are valuable to those preparing horses for fairs and exhibitions.

About three or four weeks before the horse is to be put on the track, (four, if he is taken off grass, or three, if off dry feed, will answer, but four weeks is preferable in either case), six quarts of blood should be taken from the neck-vein, and, two days after, a thorough physic must be given. The object is to relax his system, cleanse the alimentary canal from any dregs of his former feeding, and prevent the liability of his new course of feeding and treatment from disagreeing with him, which it will be very likely to do if these measures are omitted. His exercise must not be commenced until this has been done.

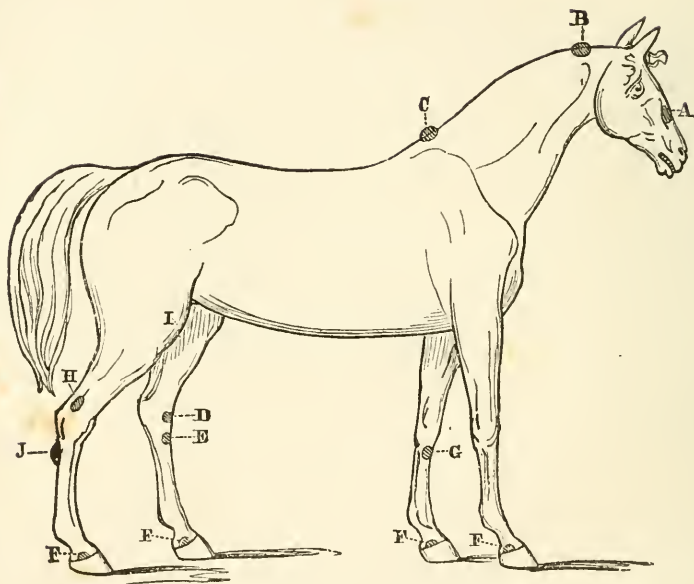
Good, clean timothy hay, having first thrashed it with a

flail to remove any dust, (some strip off the blade, but this is unnecessary), and good, sound oats, well filled, will be found the best feed that can be used. The oats should be run through a mill to rip off the points of the hulls, and then through a fan-mill, so that no dust be fed. Indeed, every article given the horse should be carefully freed from dust. If good oats can not be procured, hominy, or dry corn with the shell beaten off, may be used as a substitute. Of this kind of food, eight pounds of hay and twelve pounds of oats, or an equal quantity of corn, should be given every twenty-four hours. This should be given in four or five feeds. Much care must be taken, in watering him, that he do not drink to surfeit at any time. As a general thing, he should be allowed about two quarts of water one hour after each feeding. The second week it may be necessary to increase his feed a little; but of this the groom must be the judge. Nine-tenths of the race stock will not require any increase of the first allowance. The English cavalry horse is allowed six pounds of hay and ten of oats, or four of hay and twelve of oats. On these allowances he keeps in good condition.

After the horse has recovered from the effect of the bleeding, he must be sweat, by exercise, to harden his flesh and "make his wind," as the grooms term it. To do this, the groom will take him, early every morning, and course him until the sweat runs off profusely, at first putting on three or four horse-covers, or blankets, and for the first few days allowing him to canter slowly, but continuing until the sweat rolls off freely, being careful, however, to allow him to stop often to "make his wind," particularly for the first week. The next week take off part of his blankets and run him faster. After this the rest of the blankets are to be taken off while at exercise. This course must not be continued up to the day fixed for the race, lest he should be too weak. But his flesh must be reduced, if he is expected to stand his work. Man or beast, to endure extraordinary labor, must have vigor

ous exercise to brace his nerves. When the horse is taken in after a sweat, he must not be fed until he is cool. The sweat must be rapidly scraped off him with a regular sweat-knife, or a dull case-knife will answer; he must then be rubbed perfectly dry with cloths, of which plenty should always be at hand, or with straw. He must be rubbed until no dampness is left. After this his stable-blanket is to be put on, and his legs thoroughly rubbed down, finishing with the dry hand, and rubbing until considerable warmth is felt. Every morning and evening his cords and joints especially should be rubbed. His hoofs should be scraped every night and stuffed with cow-dung, to keep them cool and promote their elasticity. After this, bed him down for the night with good, clean straw. By this treatment you will harden his flesh and "make his wind," without which no horse can be reasonably expected to excel on the turf. If carrots can be procured, the horse should have three or four per day; nothing is better for the wind.

If a horse is badly prepared, there is danger of rupturing important blood-vessels when put to his best. A few years since I knew a gentleman to employ a quack veterinary to prepare a horse for a three-mile-and-a-half race. The same fellow was also to ride him. Just before starting, a veterinary told him the horse was not well prepared. The former replied that he prepared him himself, and that he understood his business better than the latter. Both staked their reputation on their opinions. Seven horses started, and this one took the lead for the first mile and a half, and would have won if properly prepared, but at two miles he commenced falling off, and at two and a half fell. The rider attempted to bleed him, but could draw no blood. The veterinary told him to "bleed in the belly." The horse was opened, and his blood was found to have been poured out in the cavity of the abdomen. If a horse which has been badly prepared do not die from this accident, he is very likely to become wind-broken.



VIEW OF THE HORSE, SHOWING SEATS OF DISEASE.

A, The seat of Big-head.

B, Poll-evil.

C, Fistula.

D, Blood-spavin.

E, Bone-spavin.

F, F, F, F, Ring-bone.

G, Splint.

H, Thorough-pin.

I, Stifle-joint.

J, Curb.

See pages 168 to 229, inclusive.

DIVISION III.

BONES—MUSCLES—LIGAMENTS—DIGESTIVE ORGANS—BLOOD-VESSELS—LYMPHATICS—RESPIRATORY ORGANS—BRAIN AND NERVOUS SYSTEMS—THE SKIN—THE AGE—THE FOOT.

THE BONES OF THE HORSE, OR SKELETON.*

THE skeleton, or bones, of the animal constitutes the framework to which the muscles, tendons, and ligaments are attached, or fastened, and which supports the animal in his proper form, and furnishes movable joints by which his various movements are performed. The number of bones in the horse's skeleton is one hundred and ninety-nine. This does not include the teeth. Some bones, which in the young animal are separate pieces, become solid at maturity, or full growth.

All bones, in the first place, are only a gristly substance the shape of the future bone, and which is called cartilage. The true bone substance commences to form or be deposited at several points in the cartilage for each bone, and extends from these points until those for each bone meet, and the bone becomes solid throughout its whole length or breadth. The cartilage is a very elastic substance, capable of being bent very much, and if too much weight is thrown on it before the bone is completely formed, its shape may be permanently changed, and the bone become crooked or deformed. From this it will be seen that if the colt is worked hard before the bones are completely hardened, or ossified, as it is termed, sway-back,

*See illustration on page 171.

crooked legs, and interfering will be the result. While the bones are becoming ossified the animal is capable of bearing its own weight without injury, and but little more.

Bones are divided, for the purpose of description, into three general classes, namely, long bones, short or thick bones, and broad or flat bones. The long bones have a smooth middle part, or shaft, and two heads. They embrace nearly all the bones of the limbs. Their use is to give support to the horse when on his feet, and they are the levers by which his body is carried forward. They have many ridges, prominences, or lumps, and rough places, to which ligaments and tendons of muscles are attached. They admit of very great motion at their joints, some joints moving in several directions and some only backward and forward.

The thick bones are very irregular in their shape; indeed, they are of almost every shape, and the most of them are quite rough in their appearance. Some of them have large projections for the attachment of muscles, and many prominences and rough places for the same purpose. They also have, generally, several surfaces or faces for articulating, or joining, with other bones. Their joints do not generally admit of much motion. The eight bones composing the knee are of this class, and the motion of all taken together gives considerable extent of forward and backward motion to that joint.

The flat or broad bones are quite well described by their name. Some of them are very large and broad, and of considerable thickness, while others are mere scales, and quite small. The bones of the head generally belong to this class; also those called the haunch-bones, and the breast-bone, or sternum, and the ribs. Their uses are to protect hollow cavities and furnish extensive surfaces for the attachment, or fastening, of muscles. They unite with each other by immovable joints, or sutures. Some of them have places where other bones unite with them by movable joints.

Before proceeding further it will be proper to observe that

the free surface of all bones—that is, where they are not in contact with other bones to form joints—is covered by an exceedingly tough, thin membrane, somewhat resembling the inner skin of an egg. This covering is called the periosteum. It adds greatly to the strength of the bone, furnishes it protection from injury by blows or kicks, and furnishes a bed for the blood-vessels and nerves which supply the bone. It is a very important substance.

The bone itself is composed of a dense, hard outside, and a softer, spongy inside, or pithlike structure, which is filled with the marrow, or medullary substance. The larger ends of the bones are not so dense and hard as the middle parts, particularly of the long bones.

Bones are composed of a mesh-work of a tough animal substance, which is filled in with the true bone matter, and which is principally composed of lime. If the bone part is dissolved away, there will still be left the shape of the bone, of a honey-comb-feeling substance, which may easily be crushed by the hand. On the contrary, the animal part of the bone may be dissolved away and the true bone part left, very hard, and brittle as a piece of limestone.

The joints, or articulations, of the bones deserve some attention. It will be sufficiently accurate for the purposes of this work to consider the articulations of the bones under three different classes, namely, the movable joints, the cartilage-joints, and the fixed, or immovable, joints.

The movable joints, or first class, embrace the ball and socket-joints and the hinge-like joints. They admit of extensive motion in the bones thus united. These joints are held in place by many strong elastic straps and bands, called ligaments. They are the joints most likely to be sprained or thrown out of place. For this reason they will be more carefully described when speaking of the particular bones forming the different joints of this class. The joints of the limbs generally belong to this class. The ends of the bones in these joints are

not in immediate contact, or touching each other, being lined by the synovial membrane, which secretes the joint-oil, thus allowing perfect freedom of motion in the joint.

The cartilage-joints, or second class of articulations, are united by a tough, glistening, elastic cartilage, firmly fixed between the bones it unites. The bones are also more firmly secured by straps of ligament. This kind of joint admits of some degree of motion, as the cartilage is very elastic. Examples of this kind of articulation are found in the joints of the back-bone, or spine. Some of these joints are liable to be sprained or even torn apart, and the injury is very serious and difficult to remedy.

The fixed or immovable joints, or third class, are united by sutures, there being no other substance between the parts united. Some are held together by a tooth-like arrangement; others by a projection or dowel-pin sort of fixture; others by a beveling of both plates of bone, the one overlapping the other; and others by a general roughness of the parts united. These joints do not admit of any motion. Many of them are not united until the animal is grown, and in later life some of them become entirely obliterated and the bones united as if all one bone. They are seldom the seat of injury. The bones of the head and haunch-bones, or pelvis, are united by this kind of suture.

I shall now proceed to describe the particular bones of the different parts of the skeleton, giving only such descriptions as will be necessary to understand the nature of the various injuries to which they are liable. Bones and joints not liable to disease or injury will receive but a passing notice, while those which are the seats of disease or injury will be described with more care.

BONES OF THE HEAD.

These embrace the bones of the cranium, or skull, and face. *The bones of the cranium* are ten in number, and they form the

cavity in which the brain lies. They are flat bones, united by immovable or fixed sutures. They protect the brain, and give, by their outward appearance, a pretty accurate idea of its shape. It is on the shape and size of these bones, together with those of the face, that the beauty of the head depends. And this beauty of the head is generally connected with exalted and noble spirit, for the reason that the brain is the seat and center of life and spirit, and the brain gives shape to the head. The bones are made to suit the shape of the brain; the brain first existed, and the bones were formed afterward. The names of these bones are, the frontal, two parietal, four temporal, the ethmoid, the sphenoid, and the occipital bones.

The frontal, or forehead, bone is a broad, flat bone which occupies the forward and upper part of the skull, known as the forehead, lying above the eyes.

The parietal bones occupy the upper portion of the cranium, above and between the ears. The suture or division between these two bones becomes completely ossified in older age in the horse, so that they form one bone.

The temporal bones are two on each side. They occupy the region known as the temples. They are quite thin in part of their extent, and thick and irregular in other parts.

The ethmoid bone is very irregular in its shape, somewhat resembling a bat with its wings spread and turned up. It occupies the under and forward portion of the skull, and assists to form the cavity of the cranium and also the cavities of the nose.

The sphenoid bone, or wedge-bone, occupies the lower or under part of the skull, extending across from one temporal bone to the other.

The occipital bone occupies the back part of the skull. It is a large and strong bone. It gives attachment to the first bone of the spine, called the atlas. It has a large hole through its under and backward portion, through which the spinal cord,

commonly but improperly called the spinal marrow, passes out from the brain.

The bones of the face are eighteen in number. They are named: nasal, or nose-bones, two; superior maxillary, or jaw-bones, two; anterior maxillary, or jaw-bones, two; malar bones, two; lachrymal, or tear-bones, two; palate-bones, two; turbinated bones, four; vomer, one; lower jaw, or inferior maxillary bone, one. I shall describe these bones somewhat together. First, those composing the orbit, or socket, of the eye; second, those composing the cavity of the nose; third, those composing the cavity of the mouth.

The orbit, or socket, of the eye is a deep cavity formed by the union of the *malar bone* on the forward and external part, the lachrymal, or tear-bone, forming the base, or bottom, of the orbit, the other portions of the orbit being formed by parts of the frontal and ethmoid bones.

The cavity of the nose is formed by the *nasal bones*, which constitute its forward and side walls, the cavities being separated by the *vomer* into two chambers, the vomer standing as a sort of pier under the bridge of the nose. *The turbinated bones* occupy the back part of the cavity of the nose, on each side, one above and one below. They are chiefly composed of scroll-like scales, and present something of a honey-comb appearance, being traversed by many grooves and cavities. The back outlet or passage into the mouth of the cavity of the nose is formed by the *palate-bones*, the anterior maxillary bones forming the base of the nasal cavity in front.

The cavity of the mouth is formed by the *palate-bones*, which constitute the roof of the mouth. *The superior, or upper, maxillary bones* form the upper portion of the sides of the cavity of the mouth. They unite with the temporal, the tear, the nasal, the palate, the malar, the inferior turbinated, and the anterior maxillary bones. Each *superior maxillary bone* holds six of the jaw-teeth, or grinders. *The anterior, or forward, maxillary bones* form the forward part of the upper portion of

the cavity of the mouth. They unite with each other at the middle of the upper lip, and with the superior maxillary bones where the tushes rise. They hold the six upper incisors, or cutting teeth.

The lower jaw, or inferior maxillary, bone constitutes the walls of the lower part of the cavity of the mouth. It is a very large bone, having two sides exactly alike, and which, at an early period, are not solid at the point of the chin. It articulates, or joins, to the bones of the skull by a movable hinge-joint. It receives the six lower grinders on each side, the two tushes, and the six lower incisors. No bone in the skeleton has so much to do with the beauty of the animal as this. If the lower jaw is not perfect, but large and clumsy, we at once infer coarse stock in the horse.

BONES OF THE SPINE, OR VERTEBRÆ.

The spine, or back-bone, is composed of thirty-one pieces or distinct bones, united together by tough, elastic cartilage, situated between the different pieces, which are still more firmly bound together by many straps of ligament. These bones are called vertebræ. There are seven of the neck, called cervical vertebræ; eighteen of the back, called dorsal vertebræ; six of the loins, called lumbar vertebræ. A large canal or hole passes through all the vertebræ, and terminates in the sacrum, or rump-bone. It is filled by the spinal cord, commonly called the spinal marrow.

The cervical vertebræ have a body and three projections, or processes, one process standing out from each side, and one from the upper side, called the superior spinous process. The atlas, or first cervical vertebra, has no body nor superior spinous processes, but the transverse processes are very broad. The second is called the dentata, or tooth-like vertebra, because it has a tooth-like projection which unites it with the atlas. The other bones of the neck are very much alike. The bones of the neck admit of very great motion, and are worked by

powerful muscles. Nothing adds more to the lofty appearance of the horse than a well-formed, properly-arched neck.

The dorsal vertebræ, or those of the back, are eighteen in number. Like the vertebræ of the neck, they have lateral or side processes, and superior or spinous processes. The latter are very long, and particularly so where they form the elevation called the withers. It is to these vertebræ that the ribs are attached at what are called the articulating surfaces.

The lumbar vertebræ occupy the region of the loins, or small of the back; they are six in number. They are larger and heavier than the others, and have heavier but not so long spinous processes. The sixth one articulates with the sacrum, or rump-bone.

The sacrum, or rump-bone, is a very thick, heavy bone, into which the spinal canal enters and terminates. It is situated between the last vertebra of the loins and the upper portions of the two haunch-bones, being firmly united with all these bones. It is very rough on its upper surface, having five eminences in line with, and corresponding to, the superior spinous process of the true vertebra. To the side, and between these eminences on each side, are four holes, through which the terminating branches of the spinal cord pass out. The under side of the bone is quite smooth.

The bones of the tail are fifteen in number. They are nearly round, and gradually decrease in size from the first until the last. They are united by their flat ends to each other, and the first to the sacrum by very elastic, fibrous cartilage and ligaments. They admit of very great freedom of motion, as a sweep of the horse's tail in fly-time will show.

BONES OF THE CHEST.

The bones of the chest are the sternum, or breast-bone, and ribs. The sternum is a single bone in the mature horse, and the ribs are thirty-six in number, so that the number of bones

of the chest is thirty-seven. The dorsal vertebræ also form the upper part of the chest, or thorax.

The breast-bone, or sternum, occupies the forward and under part of the chest. It is a flat bone, each end of which terminates in a cartilage. It gives attachment to the lower, or cartilaginous, ends of the eight true ribs. Many strong muscles are also attached to it.

The ribs are thirty-six in number, eighteen on each side, eight of which, on each side, are called true ribs, and ten, false ribs. The ribs are long and somewhat flat bones, the forward edges of which are rounded, and the posterior, or back, edges sharp. The upper end of each rib is called its head, and immediately below the head is a rounded smaller part, called the neck. The lower ends of the ribs terminate in cartilages, which, in the true ribs, connect immediately with the breast-bone. The cartilages of the false ribs are connected with each other, and with the cartilage of the last true rib.

The ribs are curved in their shape, the degree of curvature increasing from the first until the last.

The bones of the chest furnish protection to the principal organs concerned in breathing and the circulation of the blood, as the lungs, heart, the large arteries, etc. Many of the most important and powerful muscles of the animal are attached to the bones of the chest. The depth, roundness, and capacity of the chest is a good index to the capability of the horse for labor or exertion. Without good room for lungs, and good, large, strong heart, no horse can possess those qualities of strength and endurance which render him a valuable servant. Such heart and lungs can not exist in a flat, diminutive chest.

HAUNCH-BONES, OR PELVIS.

The haunch-bones are two in number, called, in anatomy, "*ossa innominata*," which means unnamed bones. Each bone of the pelvis is attached to the side of the sacrum, or rump-bone, by its forward end, which is broad from before backward,

and very rough on its borders and outside. From the sacrum the haunch-bone extends backward and slightly downward. The body of the bone is narrower and smoother than the ends of it. The backward part of the bone is very rough on the outside, and marked by a large, deep depression, or socket, in which the head of the thigh-bone rests. Inward and slightly backward from this depression a thick portion of the bone curves, or turns under, to meet a similar part of its mate from the opposite side, where the two are firmly united. Backward and upward from behind, where the thigh joins, is a large, rough portion of the haunch-bone projecting backward and upward, and which forms the prominence of the buttock.

These bones form a sort of basin, which the word *pelvis* means, and contain, or rather support, the parts of the bowels lying far back, as the bladder, rectum, etc.

The bones of the pelvis also furnish points of attachment for many of the muscles of the abdomen, belly, hinder extremities, etc. The length and degree of slope downward and backward are important points to be taken into consideration in judging of the qualities of the horse. Long pelvic bones, standing well back, give that length of quarter which horsemen so much admire, and which is a most desirable quality. These bones, when they project too much downward, give origin to drooping of the rump, a condition unfavorable to fleet action or great strength, for the reason that such a form deprives the muscles of the proper degree of leverage.

BONES OF THE FORE EXTREMITIES, OR ARMS.

The bones of each arm are twenty-one in number; consequently, the number of both is forty-two. They are named from above downward. The bones of the shoulder are, the shoulder-blade, or scapula, and the upper arm-bone, or humerus; of the fore-arm, the radius, or large arm-bone, and the ulna, or smaller arm-bone; of the knee, the first row from the inner side outward, the scaphoid, lunar, and cuniform; the

second row, the pisiform, trapezoid, os magnum, unciform, and one, the trapezium, lying behind the first row. The bones of the fore-leg are the shank, or cannon-bone, and two splint-bones, two small bones at the back part of the pastern-joint called the sesamoid-bones, the pastern-bone, the coronet, or lower pastern-bone, the shuttle-bone, and the coffin-bone.

THE SHOULDER-BLADE, OR SCAPULA.

The shoulder-blade is a triangular, or three-cornered, bone. It is attached, or fastened, to the forward part of the side of the chest by muscles and ligaments inserted into it, and attached to the bones of the chest, and some of the bones of the spine. It is broad at the top, and thick and heavy toward the lower end, which terminates in a shallow, hollowed cavity, which receives the head of the humerus, the next bone below it. Immediately forward of this cavity is a thick projection, called the point of the shoulder. On the outside of the bone, a high ridge starts near its upper edge, and runs downward toward the thick neck, dividing the outer side into two faces. The inner side of the bone is smooth and hollowed out, the *great saw-muscle* being attached to it. It stands obliquely, or slanting, on the side of the chest, the lower end projecting forward.

The degree of obliquity of the shoulder-blade determines the slant of the shoulder, and is a point of the greatest importance. The slanting shoulder is the only one suited to easy or rapid action. It is the only one that is capable of standing such. The upright shoulder is adapted to heavy draught, where slow motion is required. It will be readily understood why the slanting shoulder is suited to ease and quick action when the manner in which the shoulder-blade and the bone next below it stand. In the slanting shoulder they form a considerable angle, and act, therefore, like the springs of a carriage; while in the upright shoulder these two bones are much nearer on a line, and the concussion, or jar, is but little broken when the weight of the horse and his rider are thrown on them.

The upper arm-bone, or humerus, is a rather short, thick, and heavy bone, belonging to the class of long bones, having a body and two heads. Its upper head is large and round, and is received into the cavity of the lower end of the shoulder-blade.

Its lower head is large and very broad, and marked by a deep groove from before backward, and which terminates behind in a deep pit, or excavation. This groove receives a corresponding ridge, running in the same direction of the head of the larger arm-bone, or radius, the next bone below it. The pit, or excavation, at the back end of the groove is for the projecting portion of the small arm-bone, called the elbow, to rest in. The humerus is marked by several eminences for the attachment of muscles, and has attached to it the principal muscles engaged in sustaining and lifting the weight of the horse.

The upper head of the humerus rests in the shallow cavity of the shoulder-blade, and is held in place by a strong elastic ligament surrounding its head, and fastened all around the margin of the shallow socket of the shoulder-blade. This bone stands in an oblique direction, downward and backward, from the shoulder-joint. In a well-formed horse this bone should be short, and incline well back. If long, the shoulder will be too upright, and the weight of the horse too far forward. But for heavy draught this objection is not serious.

The shoulder-joint is seldom liable to dislocation, but may suffer from bruise, by the horse plunging against a solid object. The bone could hardly be fractured.

The arm-bones are two in number; the larger called the radius, the smaller the ulna. They are distinct bones, united by cartilage until advanced age, when the cartilage becomes ossified and the two bones become as one solid bone.

The radius, or larger arm-bone, has a long shaft or body, smooth before and rough behind. It has two heads, the upper marked by a high ridge from before backward, on each side of which is an excavation, or cavity. The ridge fits into

the groove of the upper arm-bone, and the two cavities receive the two divisions of its head. The lower head of the radius is broad, and marked by two slight ridges running from before backward into three surfaces, which rest on the upper row of knee-bones.

The smaller arm-bone, or ulna, is situated at the back of the *radius*, and has a long head, projecting far above the upper head of the radius, forming the elbow. It extends only a little over half-way down the radius, and terminates in a point. The two bones are united by cartilage in younger horses, but they become one solid bone in old age.

The arm is the most important part of the horse. It is to it, and particularly the elbow, that the great muscles are attached, which act to gather up the fore extremity and extend it when the horse is in motion. That the horse may have length of stride and gather quick, it is necessary that the arm should be long, and that the elbow particularly should be long. It is almost impossible for the elbow to be too long, but very common for a horse, otherwise well-formed, to have very poor action solely on account of it being too short to enable him to gather well.

In addition to length in the arm and elbow, full, swelling muscles are necessary to furnish the requisite power to raise the knee, throw the limb forward, and gather up with proper quickness. A narrow, flat, and short arm is a defect for which no other quality can make up.

The elbow is liable to be fractured, and it is a serious misfortune, but not entirely without remedy. The elbow-joint is sometimes punctured, causing rapid and high inflammation in it.

BONES OF THE KNEE.

The knee is composed of eight bones, arranged in two rows from side to side, and one bone behind the others. The upper row consists of three bones, on which the lower head of the

arm-bone rests. The second row are four, similarly arranged, and support the upper or first row, themselves resting on the upper heads of the shank and splint-bones. These bones correspond to the same bones in the wrist of man, and are united by strong ligaments, binding them firmly together. By means of these bones great strength and free motion are secured; and by the several layers of cartilage lining each where it is rested on by, or itself rests on the bone, and by the sacks of synovial membrane and their contained joint-water separating all, the concussion, or jar, which, but for this arrangement, would be produced, is prevented. No union of two bones would be sufficient to save this joint from destruction. But by this arrangement almost every other part of the horse's limbs will suffer from severe action before the knee.

A broad knee is an indication of great strength. It gives the muscles great advantage and freedom of motion. The knee is liable to the accident known as *broken-knee*.

BONES OF THE LEG.

These are three in number—the shank, or cannon-bone, in front, and the two splint-bones behind and at the sides. They correspond to the bones of the hand in man, but the similarity is not so striking as with other bones.

The shank, or cannon-bone, is a long bone having two heads, the upper being flat, with depressions corresponding with the under side of the lower row of knee-bones. The body or shaft is rounded and smooth before, and flat behind. The lower head is the form of a double pulley, a prominent ridge running from before backward, and two others, one at each side. This bone, thus marked, forms, with the head of the pastern-bone, a perfect hinge-joint, allowing of free motion backward and forward, but no other.

The splint-bones are two small bones situated at the sides, but toward the back of the cannon-bone. The splint-bone has one

head, forming part of the surface on which the lower knee-bones rest. It extends one-half, or a little over, down the shank, and is attached to it by cartilage.

The sesamoid-bones are two small bones placed at the back part of the pastern-joint, and giving the prominence of the fetlock. Their object is to strengthen the joint and give attachment and protection to the ligaments about the pastern. They enable the tendons passing over the back part of the joint to act with much greater power. Several ligaments are attached to them. (For a more full account of their anatomy and uses see the article on "The Foot.")

The pastern-bone is about one-third the length of the shank. It is somewhat flat, being rounded and smooth before, and flat and rough behind. Its upper head is the larger, and is marked by a groove and two surfaces corresponding with the lower end of the cannon-bone, with which it forms the pastern-joint. The lower head is the smaller, and convex or oval, and marked from before backward by a slight groove. It is thus divided into two oval surfaces to articulate with the next bone below it.

The pastern sets obliquely forward. Its length and the degree of its slant differ very greatly in different breeds and different horses. A pastern of good length and considerable obliquity is indispensable to easy action. It is the only form fit for the riding horse. It alone can long endure quick action. The more upright pastern can not withstand the concussion of rapid action. The horse of heavy draught should have a more upright and shorter pastern.

The coronet-bone, or lower pastern, is an irregularly square bone situated below the pastern-bone. It is broader than long. Its upper surface, or face, is hollowed out at each side to articulate with the lower end of the pastern-bone. It has a considerable projection back of the joint to which is attached part of the ligament. Its lower face is oval, to unite with the coffin and shuttle bones.

The skuttle, or navicular, bone has a body and two wings. It is placed crosswise at the back of the coffin-joint, which it helps to form. The perforating tendon passes over its body. The lateral ligaments are attached to its extremities, or wings.

The coffin-bone is the principal bone of the foot, being entirely inside of it. It is a broad, semicircular, or rather half-moon-shaped bone, being almost exactly the shape of the foot. It is the lower bone forming the coffin-joint, the face of the bone looking upward and backward being hollowed out to unite with the lower end of the lower pastern-bone. It is not a solid bone, but has many holes in it, through which blood-vessels pass. The great, broad tendon, called the tendo-perforans, is inserted into its back and under part. The sensible laminae are attached to the convex or front part of the bone, and the sensitive sole lines its under sides.

BONES OF THE HIND EXTREMITIES.

The number of bones belonging to each hind extremity, or leg, is nineteen; to both, consequently, thirty-eight. They are named from above downward. The *femur*, or proper thigh-bone; the stifle-bone, or knee-cap, called the *patella*; the leg-bones, improperly called thigh-bones, named the *tibia* and *fibula*; the hough-bones, six in number, called the *os calcis*, or heel-bone; the *astragalus*, or knuckle-bone; the *cuboid*, or square bone, and the three *cuneiform*, or wedge-shaped bones; the cannon-bone, and two splint-bones; the two sesamoid bones; the pastern-bone; the coronet-bone, or lower pastern; the coffin, or foot-bone, and the shuttle-bone.

The *femur*, or proper thigh-bone, is the heaviest bone of the horse. It has a heavy body and two large heads, or extremities. Its upper head may be regarded as having two divisions. One is a large round ball, resting in the cavity at the lower part of the haunch-bone before described. A large, rough process of the bone stands out behind this part. The great muscles constituting the bulk of the rump are attached to this

projection. The lower head is broad and thick, to join with the next bones below forming the stifle-joint. The lower head of the bone consists of two prominences, which are received into corresponding depressions in the head of the next bone below, and a hollow in front, over which the stifle, or knee-cap, plays as over a pulley. At each side of the lower head is a large projection, or prominence, called the *condyles*. They are for the attachment of muscles. The direction of this bone is downward and forward. The length of the projection of this bone, back and above the hip-joint, is of the greatest importance, for it is the point to which the great muscles, which throw the animal forward, are attached. Its length gives power, and will be known by the shape of the quarters, particularly the degree of prominence at the turn of the ham. The cup-like cavity in which the round head of the *femur* rests is liable to be fractured. The head may even be thrown out.

The *stifle-bone*, knee-cap, knee-pan, or patella, is a bone corresponding to the knee-pan in man. It is placed in front of the stifle-joint, and is held in place by ligaments. The tendons of several important muscles are inserted into it. When the horse is at rest it lies in a sort of groove at the upper part of the joint, but when in motion, it moves downward and upward, thus giving the muscles a great advantage of action. It gives great strength to the stifle-joint, which it helps to form.

The thigh-bones, as they are commonly but wrongly called, are two—the *tibia* and *fibula*. They lie between the *femur* and the hough-bones. They correspond to the leg-bones in man, and it would be more accurate to call them leg-bones.

The *tibia* is a long bone, having a large upper head and a smaller lower head. The shaft is not round, but three-cornered, the corner in front being rounded. The upper surface of the head is marked by a sharp elevation from before backward, on each side of which is a depression in which the corresponding portions of the thigh rests. The joint has forward and backward motion. The lower head of the *tibia* is marked

by two deep grooves, a central ridge between them, and another at each side. It rests on the *astragalus*, which has two elevations exactly corresponding with the grooves in the lower head of the *tibia*. At the back, its rounded surface exactly fits into a concavity of the *os calcis*, or heel-bone, to which it is firmly bound by ligaments.

The *fibula* is placed at the back of the *tibia*, and extends about one-third of the way down it. The two bones are united by cartilage in early life, but this soon becomes changed into bone. The lower bones of the thigh stand in an oblique, or slanting, direction backward, thus forming an angle with the *femur*. Two objects are thus accomplished—concussion is prevented, and the muscles are enabled to act with much greater power. And in proportion to the acuteness or sharpness of the angle thus formed, known by the knee, or stifle-joint, standing well under, will these objects be accomplished. There is great difference in this respect in different horses. This is a point worthy particular attention. The *tibia* should be long and supplied with full, strong muscles. It has been already observed how important this is in the arm, and it is, if possible, more necessary here.

The *astragalus* is a thick, heavy bone, situated beneath the lower head of the *tibia*. It is the form of a half-circle from above forward, and marked by a deep groove, with a high projection on each side, which fit into grooves in the lower head of the *tibia*. By this arrangement this joint admits of a very extensive forward motion. Behind, it is firmly attached to the *os calcis*, or heel-bone, which forms the backward projection of the hough. Below, it rests on the larger of the three wedge-bones.

The *os calcis* (*spur-bone*) is a flat, thick bone, situated at the back part of the hough, and looking backward and upward. It projects back a considerable distance. Some of the most powerful muscles are inserted into its extremity by what is generally called the hamstring. It is united by articulation

with the *tibia* and *astragalus* in front and below, and rests on the cube-bone and larger wedge-bone.

The *cube-bone* is situated at the backward and outer part of the hough, and rests on the outside splint-bone, and partly on the cannon-bone.

The *large wedge-bone* is flat and thick, and rests on the other two wedge-bones.

The *smaller wedge-bones* form the lower and front part of the hough. The inner one rests principally on the inner splint-bone; the front one on the shank-bone.

The bones of the *hough* are united by strong ligaments, and between the faces are layers of cartilage, synovial sack, and joint-water, the same as in the knee-joints. By this arrangement great strength and elasticity, or springiness, are secured, and concussion prevented.

It might be expected that a joint so complicated, and which often has to sustain a concussion equal to many thousand pounds, would be the seat of injury. Such is the case. This joint is subject to general inflammation, known as enlargement of the hough. Curb is another disease affecting it. It, or the parts about it, is also the seat of bog-spavin, bone-spavin, and capped hough.

No one can too well understand the anatomy and diseases of the hough, and the proper size and shape of its different parts, and the strength and force of the muscles and ligaments connected with it. It should be carefully studied. A horse with a diseased hough is a very worthless animal.

The *bones of the hind-leg*, from the hough down, are the same in name and number, and similarly arranged, as those of the fore-leg from the knee down. The shank is longer, and also the pasterns. The pasterns are less slanting. Smoothness and breadth are to be desired in the hind-leg. The hind-leg is liable to various injuries and several diseases, as swelled leg, grease, or scratches, etc.

BONES OF THE EAR.

These are four small bones connected with the internal part of the ear, and curiously arranged, and so delicately poised as to be moved by the slightest jar or vibration of the air in the external part of the ear. There are, of course, eight in both ears. They are named the *malleus*, or mallet; the *incus*, or anvil; the *stapes*, or stirrup, and the *os orbiculare*, or round bone. The handle of the mallet is attached to the drum of the ear, and its face rests on the anvil. The *incus* resembles a blacksmith's anvil in shape; hence its name. It has a depression in which the head of the hammer rests. The *stapes*, or stirrup, is the shape of a common iron stirrup, and is connected with the *incus* by the *os orbiculare*, or round bone. The *orbiculare* is a round bone, not larger than a grain of mustard-seed. It enables the *incus* and *stapes* to move more freely.

THE BONE OF THE TONGUE.

This bone is situated at the root of the tongue, the body of the bone lying crosswise. From the middle part a sort of pin-shaped spike of bone is inserted into the root of the tongue. Each end of the body has two horns. The shorter ascend obliquely and terminate in smooth extremities. The longer horns extend backward. Its use is to give attachment to the muscles principally concerned in swallowing, and to support the tongue and other soft parts of the mouth.

THE MUSCLES.

The muscles constitute the fleshy part of the animal. They have a red appearance, and form the great bulk of the animal body. They differ very greatly in size and length, some being very heavy, weighing many pounds, and several feet in length, while others are so delicate and small as to be very difficult to find, even by the anatomist. All muscles, however, have certain general characters, which will now be explained.

Every muscle is composed of thread-like fibers, running in the direction in which it is intended to act. These fibers form the bulk of the muscle; but they are bound and held together by fine fibers of tendon, running through the entire bulk of the muscle, and spread over its body, forming the sheath of the muscle. At the extremities of the muscle, where it is to be fastened or attached to a bone or cartilage, these tendinous fibers are collected together, and form what is known as the tendon of the muscle, and which is fastened to the bone or cartilage. Some tendons are round, and hard, gristly substances; others are broad and thin. Toughness and strength are the properties of all tendons. One end of the muscle is said to be its origin, the other its insertion.

The power of a muscle depends on the number of muscle fibers it is composed of. Some muscles have but a very few fibers, and consequently are almost white.

The spaces between the muscles is mainly filled up by cellular tissue, in which the fat is deposited. It also dips into and is interspersed through the body of many muscles. It is in the little cells of this whitish, spongy tissue that the fat is deposited or formed. The fat thus interspersed through the muscles serves to keep them oiled and soft.

Every muscle has the power of contracting, or drawing up, and of relaxing, or becoming loose. Most muscles are under the control of the will of the animal, as those of the limbs. They are called voluntary. Some act independently of the will, and are called involuntary muscles, as the heart, etc. It is by this power of the muscles that all movements of the animal are performed. In proportion to the size of the muscle will be the power with which it is capable of contracting; but, however powerful may be the muscles of the horse, if the bones to which they are attached are not properly formed for the muscles to act with advantage, their power will be spent without exhibiting either great strength or quick action in the animal.

It would not suit the purpose of this work to give a full description of all the muscles of the horse. I shall only describe such as are principally concerned in the action of the horse, and such as are the seat of, or involved in, disease.

The whole number of muscles in the horse is variously estimated by different authors. Mr. Dadd, in his great work, "The Anatomy and Physiology of the Horse," estimates the number at *three hundred and forty-four*. This is probably near the exact number. They are chiefly arranged in pairs, or twos, of the same kind. Mr. Dadd's estimate includes one hundred and sixty-seven pairs and ten single muscles.

In describing the muscles it will be impossible for me to use names generally understood, in many cases, for the reason that but few muscles have ever been named by any but anatomists, and they have given them Latin names; but I will so describe the muscles that no trouble need be caused if the names are not familiar.

Panniculus carnosus, the fleshy covering. It is a muscle peculiar to quadrupeds, or four-footed animals. It extends from the poll over the whole body and down to the arms and stifles. It lies immediately under the skin, and is attached to it by the cellular membrane. It is by the rapid action of this muscle that the horse's skin is contracted into wrinkles, and made to quiver when he wishes to shake flies or dust off his body. It is a very useful muscle to animals.

I will consider the muscles in four classes: the first class embracing those of the *head and neck*; the second, the *body, or trunk*; the third, the *fore extremities*; the fourth, the *hind extremities*.

MUSCLES OF THE HEAD AND NECK.

The muscles connected with the nose and mouth are rather slender, and of considerable length. Their names indicate their uses. Each distinct sort of motion of the lips and soft parts of the nose is the result of the action of either a single muscle or the combined action of two or more.

The same is true of the muscles of the eye and its appendages, except that they are shorter than those of the mouth. There are a number of thin or flat muscles attached to the ear, each of which moves it in a particular direction.

The fleshy portion of the jaw, or cheek, is composed principally, of the *masseter*, or chewing muscle, which is attached both to the upper and lower jaw-bones.

The next group of muscles is those constituting the bulk of the neck. The principal of these are the *splenius* and *complexus major*. The *splenius* arises from the ligament of the neck throughout its whole length, and is attached to the transverse or side processes, or projections, of all the cervical vertebræ, or neck-bones, except the first, and to a projection of the temporal bone. It is a very powerful muscle, and its office is to raise the head and neck, both muscles acting together, but one acting alone to turn the head to one side. It constitutes the principal bulk of the upper part of the neck. The chief beauty of the neck depends on this muscle. In a well-formed neck it is thick and heavy in the back and upper part of the neck, arising in front of the withers almost on a line with them, and gradually tapering and becoming small toward the head, and forming a gentle curve. If the bones of the neck are sufficiently long, this will give that arching of the neck which constitutes one of the most pleasing beauties of the horse. The neck, however, should present little else than muscles, as much fat would give it the appearance of clumsiness.

The *complexus major*, or greater complex muscle, is deep-seated beneath the splenius. It constitutes the greater part of the bulk of the back part of the neck. It arises from the side projections of the first five bones of the back, and their spines, and, passing upward and forward, is attached to the ligament of the neck, and to the occipital, or back skull, bone. It is by far the heaviest muscle of the neck. It assists in raising and curving the neck, and extends the head.

If this muscle acts too powerfully it causes that shape of

the neck known as *ewe-neck*, in which the neck is pulled or curved down, and the muzzle extended, and the horse is called a star-gazer. This is a most unsightly deformity.

Other muscles, of some consequence in assisting to raise and turn the head and neck, are the smaller complicated muscles, the *complexus minores*, the *recti*, or straight, and the oblique muscles, situated in the upper part of the neck.

The principal muscles situated in the lower part of the neck, are the *sterno maxillaries*, uniting the breast-bone with the jaw. It is a long, not very heavy muscle, its upper part being only a broad tendon. Its use is to draw the head down.

The next is the *levator humeri*, or raiser of the upper arm-bone. This muscle arises from the bones of the back of the head, and from the bones of the neck, as far back as the fourth. It passes backward and downward, and is attached, or fastened, to the shoulder-blade and the upper arm-bone, or *humerus*. It has a double action. When the horse is standing still, and both muscles act, the head is drawn down; but when in motion, it raises and carries forward the shoulder and arm.

There are other muscles of this part, but it is not necessary to describe them in this work.

The beauty and carriage of the horse is so much dependent on the shape and size of the muscles of the head and neck, that they can not be too well studied. We have already considered the proper shape and size of the bones; but these may be ever so perfect, and yet their effect be entirely destroyed by grossness and ill-shape of the muscles. The muscles of the head and face should be small, and the less fat among them the better. The nostrils should be large, and the motions of the lips, eyes, and ears quick and nervous. This is the bony head which horsemen look after, and which is the characteristic of good blood.

The neck should be long, and rise in a gentle curve from the withers forward. The muscles should be deep and full at

the back part of the neck, but should taper fast and become small forward, giving the neck a slim but muscular shape back of the jaws. The neck should not be loaded with fat; it should be made up of muscles, full and well formed, showing the creases between them. Though length of head and neck are very desirable and very beautiful, and generally found in horses of extraordinary speed, a great degree of beauty and firm action may be found in a shorter neck and shorter head, if combined with the same bonyness of the head and muscularity of the neck just described. Of the truth of this I would refer to the Morgan horses of this country. Many of the celebrated trotting-horses of the United States are of this stock.

MUSCLES OF THE BODY, OR TRUNK. •

These embrace the long, heavy muscles spread along the spine or back, from the beginning of the withers backward, forming the fleshy part of the withers and loins, and the muscles spread over and between the ribs, giving form and strength to the chest, and the many broad muscles which form the walls of the belly, or abdomen.

The muscles of the back are very powerful. Some fill the spaces at the sides of the spines, or upper projections of the vertebræ, or back-bones, and give the back its full, round appearance. Others are seated beneath the spine on its inner side. These muscles are principally attached to the spines, or upward projections, and side projections, or processes, of the vertebræ, and to the bodies of these bones themselves, and to the bones of the pelvis, or basin, behind. These muscles give strength to the back, and are the principal muscles brought into action in rearing and kicking.

The principal of these muscles is the *longissimus dorsi*, or long muscle of the back. It lies on the upper and side parts of the back and loins, being attached as far forward as the fourth bone of the neck, and then to different parts of all the bones of the spine, and to the upper part of the last twelve

ribs, and to the rump and haunch-bones. Other of these muscles are the *spinalis dorsi*, beneath the *longissimus dorsi*, in the region of the withers. It assists in forming the bulk of the withers, and to raise the neck. The *semi-spinalis dorsi* lies back along the loins squarely. It assists the others.

Another great muscle of the loins is the *psoas magnus*. It forms the bulk of the inner part of the loins. It extends from the last ribs backward, attaching to all the vertebræ it passes, and is inserted into the upper and front part of the upper thigh-bone, or femur. It acts to draw up the haunch. There are several other muscles of this region, but they are only helpers of the others, generally.

The muscles of the chest are generally of considerable length, and somewhat broad. They are attached to the back-bone, or spine, above, and to the shoulder-blade, humerus, ribs, and breast-bone below. Their office, as a class, is to complete the walls of the chest, and to expand it in the act of breathing, and, especially, to move the shoulder-blade and upper arm-bone, or humerus. Some of them deserve particular mention.

The trapezius starts from some of the high projections, or spines of the dorsal vertebræ, the third, fourth, fifth, and sixth and descends down the side of the withers, and terminates in a point which is fastened to the high ridge on the outside of the shoulder-blade. It serves to draw this bone up and backward.

The latissimus dorsi arises from the bones along the withers, and as far back as the small of the back, and passes downward and forward, and is attached to the back part of the humerus, or lower shoulder-bone. Its use is to draw this bone up, or flex it. It is a very powerful muscle, and, in the well-formed horse, acts with great mechanical advantage.

The most important muscle of this part is the *serratus magnus*, or great saw-muscle. It is found between the shoulder and side of the chest. It arises from the side projections of the last four bones of the neck, and from the lower portion of the first eight ribs, and passes up between the rib and shoulder-

blade, and is attached, or fastened, to the upper and inside part of this bone. It is the principal agent in sustaining the weight of the animal. It is the seat of *strain of the inside of the shoulder*.

Muscles of the Abdomen, or Belly.—These are generally broad and long muscles, extending from before backward, being attached to the ribs in front, and the back-bone and haunch-bones behind. They form the walls of the abdomen, and assist in drawing the hinder parts forward. They also compress the bowels and assist in expelling their contents.

The diaphragm is a muscle which should be well understood. It forms the partition wall between the chest and belly. It is a broad, thin muscle of very great power. It is attached to the cartilages of the last pair of long, or true, ribs, and to those of all the short ribs, except the last, and to the back end, or cartilage, of the breast-bone; also, to the bones of the loins, or lumbar vertebræ. It is the principal muscle concerned in moving the walls of the chest in breathing. Hiccoughing is a spasmodic action of this muscle, and is a very dangerous symptom in disease. The lungs and heart lie in front of the diaphragm, and the liver, stomach, and intestines behind it. The gullet passes from before this muscle to the stomach behind it.

Muscles of the Fore Extremities, or Arm and Fore-leg.—This is one of the most important classes of muscles of the horse. On their size, shape, and action the usefulness of the horse, to a great extent, depends. Their office is to effect the various motions of the fore extremities. They are generally heavy, round, and long. Many of them have long, round tendons, passing down to the lower bones of the limbs.

The antea spinatus occupies the space in the front part of the outer side of the shoulder-blade, in front of the high ridge dividing the bone. It is fastened to the space in which it lies, and extends down, and is attached to the capsular ligament of the shoulder-joint. Its action is to extend, or straighten, the upper bone of the arm, or humerus.

The postea spinatus fills the space behind the ridge of the outer side of the shoulder-blade, to which it is fastened, and extends downward, to be attached to the upper and outer part of the humerus and to the capsular ligament of the shoulder-joint. Its action is to assist in drawing the humerus, or upper arm-bone, upward and backward.

These two muscles make up the principal part of the bulk of the side of the shoulder, at the upper part. They are the seat of the disease called *sweeny*. It is a wasting away, or atrophy, of these muscles, or either of them.

The teres major lies behind the last-named muscle. It is attached to the back part of the shoulder-blade and ribs, and extends downward, and is attached to the upper arm-bone, or humerus. Its action is to flex this bone and turn it inward. Other muscles of this region, concerned in the backward and forward motion of the upper arm-bone, or humerus, might be studied with interest; but it does not suit our purpose to take space to explain them. But every horseman should have their proper shape, size, and locality well fixed in his mind. Much of the animal's usefulness depends on these muscles.

The next important group of muscles to be noticed are those chiefly concerned in the motions of that part of the limb commonly called the arm, and the parts of the leg below it. These muscles consist of three groups. The first group consists of four muscles, lying in front of the arm, and their use is to extend, or straighten, the different parts of the limb to which their long tendons are attached. They are called extensor muscles, and their tendons extensor tendons, because they act to extend, or straighten, the limb.

The next group lie at the outer side of the arm, and are also four in number. Their office is to effect the drawing up and backward motion of the different parts to which they are attached by their long tendons. They are called flexor muscles, and their tendons flexor tendons, because they act to flex, or draw up, the leg.

The next is a group of five muscles, situated beneath the last group. They are also flexors. Some of their tendons extend down to the foot.

As has already been intimated, these several groups of muscles are supplied with long tendons, to reach from the arm to the several bones below, to which their tendons are attached. As they pass the knee and other joints, they pass through loops, or bands of tough ligaments, through which they act as through pulleys. These tendons are prevented from injury, by rubbing, or friction, by passing through a sheath, lined by a soft, lubricated membrane. These tendons are gathered in a sort of bundle at the back of the cannon-bones, and form what is called the back tendons, or sinews.

By this arrangement of the muscles being placed high up, about the arm, and their long tendons passing to the lower parts of the leg and foot, great strength and free, quick motion are secured, and but small space occupied.

Every person should know that unless the muscles of the fore-limbs are full and well formed, and particularly those of the arm, the horse is an inferior animal, however beautiful in other respects. But the position of and freedom with which the tendons act is of much importance. They should pass freely by the joints and stand well out from the cannon behind, giving the leg the appearance of breadth from before backward. Without this, no horse can excel in the exhibition of strength or quick action, and will certainly give down under protracted service.

Muscles of the Hind Extremities, or Legs.—The muscles belonging to this class constitute the bulk of the hams, or quarters. They are very heavy and powerful, and are principally concerned in propelling the horse forward and bearing weight; but this mainly falls on the fore-parts.

The largest of these muscles are the *glutæi*, (the *three-headed* and the *two-headed* muscles.) They make up the fleshy part of the quarters above. They arise mainly from the rump and

haunch-bone, and pass downward, and are attached to the *femur*, or upper thigh-bone. They act to draw the limb forward, or, rather, to flex it. There are many other muscles of this part of the hind extremities, but the only way to form a correct idea of them, is by actual dissection of the dead animal. They lie beneath those already mentioned, for the most part, and are attached below to the thigh-bones, which they assist in moving.

The next group of muscles to be considered is those lying about the lower thigh-bone, and whose long tendons pass down to the bones of the hough and those below it. Very important in this class are the *gastrocnemii* muscles, whose long tendons are attached to the point of the hough, and which are commonly called the hamstrings. These muscles arise from the lower parts of the upper thigh-bone, or *femur*. The tendon of one of these muscles passes over the hough and on down to the lower pastern-bone.

The muscles lying about the lower thigh, or proper leg-bone, resemble very much those of the arm in the fore-limb. They have long tendons, which are attached to the bones about the hough, or pass this joint to be fastened to the different bones below. These tendons are also held in place by loops of ligament, through which they pass, and are protected by the tough sheaths which surround them. Their office is to effect the various motions of the parts below the hough, and to flex and extend the foot.

The muscles of the hind extremities should be full, solid, and long. But if the bones of this part are well formed, there is only one danger in the muscles; they may be loose and flabby, and act with but little power. They are the power by which the horse is urged forward. They need great strength. The shape, size, and position of the hough will have much to do with the effect with which those muscles, whose long tendons pass to the lower part of the limb, act. After passing the hough, the back tendons should stand well out from the leg,

giving it a decided appearance of breadth from before backward.

I have now given a somewhat imperfect glance at a few of the most important muscles of the horse, and endeavored to make what I have said intelligible to all. But this task has been very difficult, from the fact that the names of the muscles are all Latin, there being no English or common names for them. It is to be hoped, however, that enough has been said to show to the farmer and breeder that good muscles are indispensable to great strength, quick action, or endurance; that, however beautiful the horse may be, if he is not furnished with full, solid, well-formed, and properly placed muscles, he is not a desirable animal. The great indication of good muscles is, that they show through the skin in full, round ridges, or elevations, their edges being marked by creases. But muscles must act with advantage; hence, look well to the joints and bones that they are perfect.

LIGAMENTS.

IN the horse there are many ligaments, or straps, bands, and rings of ligaments, which serve to hold the joints in place, and form loops for the tendons of muscles passing over the joints. They are tough, dense substances, and give prodigious strength to the joints. There are a few ligaments which deserve especial notice:

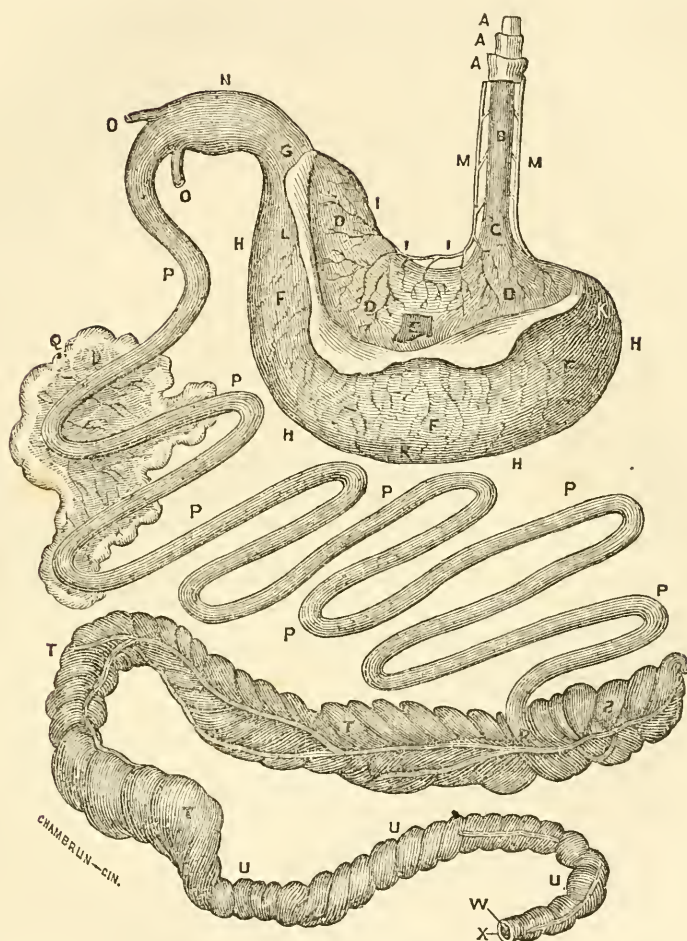
The ligament of the neck, (ligamentum colli), sometimes called the pack-wax, is a large, round ligament, which arises at the upper and back part of the head, and passes back, touching the second bone of the neck, by leaving the others far below it, until it reaches the long spines of the back-bones which rise up to form the withers, to which it is attached. It may

be distinctly felt through the skin, just where the mane rises. It is the principal agent in supporting the head and neck; but being very elastic, it permits the head to be lowered, even to the ground. This ligament is peculiar to quadrupeds, or four-footed animals. The seat of poll-evil is beneath the forward end of this ligament, over the first bone of the neck. It is sometimes severed in this disease.

The ligaments of the stifle-bone; or *patella*, attach it to the *femur*, or upper thigh-bone, above, and to the lower thigh-bone, or proper leg-bone, below. These, of course, are two different sets of ligaments. The stifle-bone is sometimes thrown out of place, and in this case some of the ligaments must be torn loose and others badly strained.

The ligaments connected with the foot-bones have been described in the chapter on the foot.

Whenever a joint is thrown out of place, or badly wrenched, the ligaments are either torn or very much strained, and considerable time and rest will be necessary for them to recover. In certain places the ligaments may, from disease, be converted into bone, as happens with those about the hough in spavin, about the pasterns in ring-bone, and ossification of the lateral ligaments.



STOMACH AND INTESTINES.

A, A, A, Showing the three coats of the stomach. They are easier shown on the gullet than on the stomach.

B, The main esophagus, or gullet.

C, The region of the cardiac orifice of the stomach; cardiac meaning toward the heart.

D, D, D, The muscular coat of the stomach, showing the distribution of the nerves.

E, The cellular and mucous coats, shown by the reflection of the peritoneal coat.

F, The peritoneal coat reflected, or turned over. This would indicate the stomach having four coats. I hold that it has but three proper.

G, Region of the pyloric orifice, or opening from the stomach into the first intestine, called the duodenum.

H, H, H, H, The great convex or circular border of the stomach.

I, I, I, The concave border, opposite to the convex border of the stomach.

K, The fundus, or culdesac, (fundus, the bottom; culdesac, the bottom of a bag).

L, The small culdesac.

M, M, The nerves of the stomach as they pass along the gullet and branch over the stomach by the sympathetic nerves. Disease caused by injudicious feeding is conveyed to the destined locality of the disease through sympathy of the parts with the stomach. The involuntary nerves are those which stimulate the stomach in the motion necessary to digestion, independent of the will. The sensitive nerves are also present, by which pain and satisfaction are felt, and by which the horse knows when he has enough of food in the stomach.

N, The duodenum, called by some the second stomach. Here the bile from the liver and the secretion from the sweet-bread, or pancreas, enter through two ducts. These fluids change the chyme formed out of the food by the gastric fluid into a mass called chyle. It is then fit for nutriment, to be taken up into the general system. (See article on that topic.)

O, O, The ducts receiving the bile and secretions from the liver and pancreas.

P, P, P, P, P, P, P, The jejunum and ileum.

Q, Represents a portion of the mesentery, which covers and keeps the bowels in their proper situations, and other purposes. This is thrown open to show its connections with the bowels. (See article on the "Bowels.") For this purpose I put the bowels in this shape.

R, Here the ileum enters the junction of the cæcum and colon by what is called the iliac valve, or junction.

S, The cæcum, or water-pouch, called the blind-gut.

T, T, T, The colon, or great gut. It is the largest of all the bowels.

U, U, The rectum, or last gut.

W, W, The anus, or outer passage from the bowels.

X, Sphincter muscle, which closes the fundament. It is voluntary and involuntary. It closes with or independent of the will.

THE ORGANS OF DIGESTION.

THESE include all those parts of the animal concerned in preparing the food for repairing and building up the body. They extend from the mouth back to the last bowel. Those situated in the mouth are the lips, teeth, tongue, and the salivary glands. The gullet, or esophagus, leads from the mouth to the stomach. The organs of digestion situated in the belly, or abdomen, are, the stomach, small intestines, large intestines, liver, spleen, pancreas, kidneys, and bladder. Of these the spleen, kidneys,

and bladder are, perhaps, not properly organs of digestion, as their action is rather upon the blood than on those fluids formed of the food taken by the animal. But it is convenient to describe them under this head. For the same reason I shall describe the peritoneum, or investing membrane of the bowels, in this chapter.

The lips are two in number, the upper and lower. They are composed of masses of elastic cellular tissue, small muscles, and glands. They are partly covered by skin, and on their inside starts the mucous membrane which lines the inside of the entire alimentary canal. The lips of the horse serve to grasp the food and bring it within the mouth.

The teeth have been described in another part of this work. I shall only consider them here as concerned in preparing the food for the system. The front teeth are for cutting the food, and the back teeth for grinding it.

The tongue is a large, muscular organ situated in the lower part of the cavity of the mouth. It is attached by its roots to the hyoid bone, or bone of the tongue, and along the under side of its body to the lower jaws. Its forward part is free. It is the organ of taste, and its use is to move food about in the mouth during the process of chewing, and to carry the parts which are sufficiently masticated back into the pharynx to be swallowed. It is not the only organ having nerves of taste. The palate, pharynx, and, probably, the gullet, have some nerves of taste.

The salivary glands are six in number, three on each side of the mouth. They are named the sublingual, the submaxillary, and the parotid glands.

The sublingual glands are situated under and one at each side of the tongue. They are the smallest of the salivary glands. Each gland has little ducts, or tubes, leading from it, and opening into the cavity of the mouth. The ducts of the sublingual glands open under the fore-part of the tongue.

The submaxillary glands, one on the inside of the turn of each

side of the lower jaw, are larger than the sublingual glands. A part of each gland lies as far back as the forward part of the windpipe. Each of these glands has a tube, or duct, leading from it, which passes along the under side of the tongue and opens into the mouth by a little, nipple-like elevation, under the fore-part of the tongue. This little elevation is commonly called the *barb*, and some are foolish enough to snip it off.

The parotid glands, or almonds of the ear, are situated, one on each side of the head, behind the branches of the lower jaw, and in front of the heaviest part of the temporal bones. They extend as high up as the roots of the ears, and down to the turns of the lower jaw. They are the largest of the salivary glands. Each gland has a duct, or tube, leading from it, which passes along the inner part of the turn of the jaw and crosses to the outside a little forward of the turn, and passes forward, and opens into the mouth opposite the grinding teeth. The salivary glands secrete the saliva, which is a clear fluid, and which is mixed with the food while it is being chewed. The saliva is poured out in large quantity while the horse is eating. Several pounds of this fluid are poured into the mouth during a meal. It renders the food soft and moist so as to admit of being swallowed, and also more readily acted upon by the fluids of the stomach. There are also many small glands situated within the mouth, which assist in furnishing saliva to moisten the mouth and the food taken into it.

The pharynx is a wide opening in the upper part of the throat, of a funnel shape, and which opens back into the gullet. The food is carried back by the tongue and lodged in the pharynx, from which it goes on into the gullet.

The gullet, or esophagus, is a long, muscular tube extending from the pharynx, in the back part of the mouth, to the stomach, in the abdomen. In the first part of its course it lies between the windpipe and bones of the neck, but soon passes to the left side of the windpipe, and passes into the chest with it. It then inclines upward along the space between the lungs,

and passes through the diaphragm, and enters the stomach at about the middle of its upper and forward part.

The bulk of the gullet is composed of muscle. Some of the fibers run lengthwise of the tube, and others around it. Its internal coat is of a smooth, glistening character, of the nature of skin, and hence called its cuticular coat. Many little glands are situated between the two coats of the esophagus, and pour out a fluid to moisten its internal surface, and enable the food to pass freely down it.

The use of the gullet is to convey the food from the mouth back into the stomach. In many animals it admits of the contents of the stomach being thrown back into the mouth through it, in the act of vomiting, and, in some, in chewing over the food a second time; but the horse neither chews the cud nor vomits, except in extreme cases. When food is not passing from the mouth to the pharynx, the soft palate and the epiglottis separate the two cavities. If the horse attempts to vomit, the palate is forced forward, entirely closing the passage to the mouth; so if any thing passes, in the act of vomiting, it must be forced out through the nose. As the food passes into the larynx, its muscles contract, and force it on into the gullet; the muscles of the gullet then contract along behind the food, and force it on down into the stomach.

The stomach of the horse is not near so large as might be expected. It varies in size in different horses, in some only being large enough to contain about nine quarts; in others, holding as much as thirty-two quarts; the average holding about fourteen quarts. The stomach lies just behind the diaphragm, and in the left side of the abdomen. It is in contact with the diaphragm, the liver, the spleen, and the small and large intestines. There are two openings to the stomach—the one by which the gullet opens into it, situated on the side next the diaphragm, the other by which it opens into the intestine, called the duodenum. The latter of these openings is at the smaller end of the stomach.

The stomach is composed of several different coats. The outer one is only a folding of the peritoneum, a membrane common to all the parts within the belly, over its outside. The second is the muscular coat, which constitutes the principal thickness of the stomach. There is greater thickness about the part which opens into the intestine than at any other place. The fibers of muscle run in different directions, so that by their action the contents of the stomach may be turned round in any and every direction. The third coat is only cellular tissue, connecting the mucous coat with the muscular. The mucous coat lines the greater part of the internal surface of the stomach. For some distance from where the gullet enters the stomach, a thick, skin-like substance, or membrane, is spread over the internal surface of the stomach. This is called the cuticular coat, and is the part to which the bots are attached during the period of their growth.

The stomach is abundantly supplied with blood-vessels, which traverse every part of its substance. It is well supplied with nerves. Many branches of what is called the sympathetic nerve are spread through the stomach. It perhaps owes to this its extensive range of sympathy with other parts.

The stomach is the great organ of digestion. After the food is ground up in the mouth and mixed with the saliva, it is carried by the gullet into the stomach. It is here rolled round and round, and turned from side to side, by the action of the muscular coat of the stomach, and another fluid is here mixed with it, called the gastric juice. The gastric juice is poured into the stomach by many little vessels, whose mouths open into the mucous coat. This fluid has great power of dissolving such articles as the horse eats. By its action the food is converted into a milky-looking fluid, called chyme. As fast as this is formed, it is poured into the intestine. It is not until after the stomach has long acted upon hard substances that they are forced into the intestine.

The diseases of the stomach are numerous and important.

Indigestion is the most frequent. Many other ailments of the horse have their origin in the stomach.

THE INTESTINES.

The intestines constitute that part of the channel which extends from the stomach to the outlet behind. They are naturally divided into the small and large intestines, the whole length of both being about ninety-three feet. The structure of the intestines is similar to that of the stomach. They are composed of three coats. The outer is an envelope of peritoneum. The middle is a muscular coat. The internal is the mucous coat.

The small intestine commences at the termination of the stomach. The first part, which is about two feet long, is called *the duodenum*. It is the largest part of the small intestine. About five or six inches back from its commencement, the ducts from the liver and pancreas enter it. This gut is sometimes called the second stomach. It is well fixed in its position. It forms a large curve round to the right, and ends on the left side of the spine, in the second division, or jejunum.

The jejunum is the next division of the small intestine. It embraces two-fifths of what is left of the small gut. The food passes rapidly through it. It is generally found empty, from which it takes its name.

The ileum is the last and longest part of the small gut. It terminates by entering into the *cæcum*, or blind gut. Its end is shut by a valve which allows the contents of the ileum to pass into the *cæcum*, but nothing to pass back.

The small intestines are abundantly supplied with blood-vessels, and have a great number of glands opening into them, whose office is to take up the digested food, or chyle, and carry it into the blood. After the food has passed about five or six inches into the gut, it is mixed with the bile and another fluid from the pancreas. The chyme then commences to separate into two parts, the one being of a thick, white character, and called

chyle. This is the part taken up by the glands to build up and sustain the body. The other is of a yellowish appearance, and passes on to be thrown out of the bowels as excrement, or dung.

The large intestine is divided into three parts, called the *cæcum*, or blind gut, the *colon*, and the *rectum*, or straight gut.

The cæcum is a large pouch which extends backward from where the small gut enters it. It is situated in the lower part of the belly, obliquely from the left to the right. The *cæcum*, like the *colon*, is drawn into smaller sacks by bands arranged along it. It holds about four gallons. It is known that the horse drinks more than his stomach can hold. Nature has provided this gut as a sort of water reservoir for the horse. As the horse drinks, the water does not stop in the stomach, but passes rapidly into and through the small gut into the *cæcum*, where it remains to supply the system. It is sometimes called the water stomach. It is very valuable to the horse, and is one of the wisest of nature's provisions.

The colon is small where it starts, but soon expands, or widens, into a very great size. It has the same puckered appearance of the *cæcum*. It occupies the greater part of the lower portion of the belly. In its course, starting from far back in the right side of the belly, it passes forward to the diaphragm, where it turns irregularly, and passes back on the left side of the belly, where it twists round like the letter S, and then passes forward and again crosses the spine; it then continues back some distance, and again crosses the belly, constituting what is called the transverse colon. It then proceeds back again, forming the single colon, and terminates in the rectum, or straight gut.

The remaining portion of the food, after having passed through the small gut, passes on into the colon. Here whatever may be left in it fit for supplying the system is taken up, and the remainder, with much worn-out matter of the system, is passed on into the rectum.

The *rectum*, or last gut, does not vary much in size from the straight colon, of which it is a continuation. It is drawn into the same sort of puckers as the colon. These pouches form the dung-balls. The rectum terminates at the anus. Its back portion is surrounded by a broad, strong muscle, by which it is closed firmly, and only relaxed by the combined force of the contents of the gut being pressed against it and by the will of the animal.

The office of the rectum is to retain the indigestible parts of the food, and such worn-out matter of the system as is thrown into the bowels, until a sufficient quantity has collected, when, by the action of the diaphragm and muscles of the belly, it is thrown out as dung, or *feces*.

The bowels are the seat of many diseases, which it is not necessary to particularize here. They are fully considered in the part of the work treating of diseases. The proper care of the horse's digestive system is of the utmost importance. Improper and unsound food thrown into the stomach of the horse can not fail to do mischief. So of the habit of feeding and watering when the horse is very hungry, or fatigued, or hot, when he will certainly gorge his feed down, and drink more than the wants of the system require. I believe it might be safely calculated that by injudicious feeding and watering an average of five years on the lifetime of our horses is lost. Keep the horse's stomach and bowels healthy by intelligent and judicious feeding, and he will seldom need medicine, and, what is quite as fortunate, will hardly ever lie down and die of any of those quick diseases which destroy so many horses in the very prime of their age and usefulness.

THE PERITONEUM.

This is a thin, glistening membrane, which lines the inside of the cavity of the abdomen, and folds of which are thrown around all the different parts contained within the

belly. It is attached to the walls of the belly, and to the parts enveloped by it, by delicate cellular tissue. Its free surfaces, which are in contact with each other, are very smooth, and softened by a fluid which they secrete. It admits of the freest motion among the bowels. It holds the contents of the belly in their proper place. But for it the guts would soon become entangled and knotted by their own action, as does sometimes happen when it is broken in violent colic.

THE LIVER.

The *liver* is a very large gland of a dark, reddish brown color. It is principally situated to the right side of the cavity of the belly, behind the diaphragm. It is divided into three parts, or lobes, by two deep grooves. Its forward side is convex, or rounded, to fit the shape of the diaphragm. Its left lobe is in contact with the stomach, the pancreas, and the part of the large gut which stretches across the belly, called the transverse colon. Its middle lobe below is crossed by the pancreas. The right lobe is in contact with the right kidney, the pancreas, the duodenum, and the transverse colon. It is held in place by four ligaments and the folds of the peritoneum over it.

The use of the liver is to secrete or manufacture bile. The bile is formed in the liver and carried away from it by the biliary duct, which pours it into the gut called the duodenum, about five or six inches from the stomach. The horse has no gall-bladder, as most animals have. The bile is poured into the bowel as fast as it is formed, instead of being collected in quantity in a gall-bladder. A great quantity of blood is poured into the liver by what is called the portal vein. This blood is brought from the intestines, spleen, and stomach. It is purified, to some extent, in the liver, and then sent on to the heart to be sent to the lungs.

The bile is a very important fluid. It is of a thick, dark-

green color. It first causes the fluid, into which the food is changed in the stomach, to separate into two parts as it mixes with it, the one being the chyle, which is fit to be taken up to nourish the system, the other being the part unfit for use.

The bile is the natural physic of the animal. It also prevents the food from fermenting in the intestines.

The liver is liable to inflammation, and, ceasing to act properly, causes jaundice.

THE SPLEEN.

The spleen is a large, spongy organ, of a purple-gray color, broad and thick at the larger end, but tapering and thinner at the smaller. It is commonly called the melt. It lies along the left side of the stomach, between it and the short ribs. It also lies against the left kidney.

The use of the spleen is unknown. It has been removed from animals without any apparent injury. It is sometimes greatly enlarged by disease.

THE PANCREAS.

The pancreas is sometimes known by the name of the *sweetbread*. It is of a whitish, knotty appearance. It is long, and of irregular thickness. It lies between the stomach and left kidney, stretching across between the lower and one of the curves of the large gut. It has a duct which opens into the intestine at the same place as that from the liver. The pancreas secretes a fluid which is concerned in digestion, but just what part it performs is not known.

THE KIDNEYS.

The kidneys are two thick, flattened, broad, rather long bodies, of a dark, reddish color, situated in the small of the back, one on each side of the spine, the right kidney being situated furthest forward. The right kidney is in contact with

the liver; the left with the spleen and stomach. The kidney is not a solid body, but it has a funnel-shaped cavity, or hollow, in it, which opens into a tube leading to the bladder, called the ureter. A large artery is sent to each kidney, by which a large part of the blood is caused to circulate through it.

The office of the kidneys is to secrete the *urine*, or water. In this process a very poisonous substance, called *urea*, is separated from the blood; also, several other substances which would be injurious to the system, if left in the blood. Along with these a large quantity of water is also separated from the blood.

The kidneys are liable to inflammation and some other diseases not very well understood.

The *urine*, or water, is subject to very great changes in quantity, appearance, and composition, even in health, and much more so in disease. There are many medicines which act on the kidneys, increasing the flow of water and changing its character. These medicines are called diuretics. They are very useful in treating the diseases of the horse.

Kidney Stagers.—This is a type of staggers met with in some parts of the world. It is frequently met with in Ireland but, as it seldom, if ever, occurs in this country, I shall merely give the history of one case which came under my observation, and which will give a sufficiently accurate idea of the disease.

My father had a mare that took this disease a few days after being used to haul turf about half a mile. There was no obstruction in the way from the place where the fuel was got to where it was hauled. When the mare was attacked, she commenced walking back and forth, just as she had done when at work, but at a heavy, staggering gait, and at noon would go to the place where she had been fed, but would eat nothing, and after awhile renew her accustomed walk between the two places. She continued this for over two days, evidently becoming more and more exhausted. When turned

from her course shortly, she would fall, evidently from weakness of the hind-parts. On the second day she was bled, but without doing any good. On the third day I gave her quite half a gallon of lime-water, and she began to mend immediately. 'I have found this remedy effectual, ever since, in this disease.' This differs from other kinds of staggers in the mental symptoms. The horse's mind seems good enough, generally, but he labors under a delusion, thinking that he is still laboring at whatever work he last performed. It is perhaps occasioned by some derangement of the kidneys, the brain sympathizing. This is most likely produced by the animal getting too much salt with his grass for a considerable time, as is often the case in those districts bordering on the ocean, where all vegetation is ready salted by the dew and spray.

THE BLADDER.

The bladder is a sack composed of a very elastic membrane of a white color, and which is situated in the back part of the cavity of the belly, beneath the rectum, or last gut. . It is of a pear shape, and two small tubes enter into its larger part, or body. These are the *ureters*, two small tubes, or ducts, one of which comes from each kidney, and which convey the urine from the kidneys into the bladder. When there is no urine in the bladder it is very small, but when it is full it holds several quarts. One large tube starts from the bladder at its small end, which is called the *urethra*. Its use is to carry the urine away from the bladder.

It has already been stated that the bladder is to receive the urine. It is retained in it as a sort of reservoir, until by an effort of the will, the tube leading from the bladder is opened, when the water is ejected in a stream by the contracting power of the muscular coat of the bladder. The bladder is liable to inflammation, and stones sometimes form in it.

The urethra passes down the organ called the penis in the

male, and terminates at its point in an open mouth. It is of considerable length. In the female it is shorter, and passes back along the under side of the wide channel leading to the womb, or uterus.

ORGANS OF REPRODUCTION.

THESE are very complicated parts, both in the male and female. But, however interesting might be the study of them, the object of this work will only allow a hasty reference to them.

The male organs of generation are the penis, with the urethra running along its under side, the testicles, with their appendages, situated in the scrotum, or sack, between the thighs, and the tubes leading from the testicle to the urethra. The semen is formed in the testicle and thrown into the urethra through these tubes.

The female organs of generation are a very curious set of organs. They consist of the prominence starting just below the fundament and extending four or five inches downward, called the bearing, and which is marked by a fissure, or opening. This opening leads into the wide tube which leads to the womb, or uterus, and is called the vagina. Lying just within the opening of the vagina is a spongy body called the *clitoris*, which resembles the head of the male penis, and like it becomes larger and hard when the animal passion is excited. It is the seat of the pleasurable sensation in the act of union of the male and female.

The vagina, as just stated, is a large tube leading to the womb. It lies between the bladder and rectum. It is about eighteen inches in length.

The womb is a somewhat long, muscular body, situated at the

termination of the vagina, its mouth opening into the vagina. The cavity of the womb is designed for the *fetus*, or foal, before birth. The womb is a comparatively small body when there is nothing in it, but becomes very large as the foal approaches the time of birth. Two horn-like prominences arise from the womb, one on each side, from which arise two tubes, each of which winds its way to the *ovaries*, two egg-shaped bodies, one situated in each loin. These bodies contain the ovum, or egg, which, if brought in contact with the semen of the male at the proper time, will descend the little tube into the womb and stop there, becoming attached to the wall of the womb, and become a living foal. One of these eggs becomes ripe, so to speak, every time the mare is in season. If she is not served by the horse at this time, the egg that had become ripe passes into the womb, but does not stop there, but passes out at the mouth of the womb, and is lost.

The process of reproduction is this: The semen, the white fluid which the male furnishes, is thrown into the womb, and from it passes up the *fallopian tube* to the ovary, or egg-sack, and there comes in contact with a mature or ripe egg, called an *ovum*, which immediately takes on a new life of its own. It is then said to be impregnated. The impregnated ovum then descends by the fallopian tube into the womb, becomes attached to the walls of the womb, and rapidly commences to form the living animal, or fetus. It remains in the womb for the space of eleven months, when all the parts of the foal are sufficiently developed, and it is then expelled from the womb by a powerful contraction of the womb itself, and all the muscles of the chest and abdomen acting together.

THE BLOOD-VESSELS.

THESE are the *heart, arteries, veins, and capillaries*. They form the channel through which the blood circulates.

The *heart* is a pear-shaped body of considerable size, situated mostly in the left side of the chest. Its larger end is forward, while its pointed end is directed backward and toward the left side. The heart is a large, muscular organ, having four cavities, or chambers, called the right and left ventricles, and the right and left auricles. The ventricles have thick, strong, muscular walls; the left the stronger of the two. The auricles have thin walls. The heart is surrounded by a tough, elastic membrane, called the *pericardium*, which is attached to the diaphragm and the large blood-vessels in front.

Two great blood-vessels pass out *from* the heart. Both are arteries, one called the aorta, and the other the pulmonary artery. These arise from the ventricles. Three blood-vessels return to the right auricle, and two to the left. The first of these is the vena cava. The other two are the pulmonary veins. There is an opening between the right auricle and right ventricle, and also between the left auricle and left ventricle; but the two sides of the heart are separated by a perfect partition. The opening between the auricle and ventricle is closed by valves—between the right auricle and ventricle, called the tricuspid valves; between the left auricle and ventricle, the mitral valves. The opening of the large arteries leading from the ventricles are closed by three valves, called the semilunar (*half-moon*) valves. The blood can pass through the valves in the proper direction, but can not flow back through them.

The blood, loaded with impurities, is brought from all parts of the body, by the veins and from the two vena cava, is poured into the right auricle, which contracts and forces the blood through the tricuspid valves into the right ventricle. This then contracts and forces it through the semilunar valves into

the pulmonary artery, by which it is carried to the lungs, where it is exposed to the air, and its color changed from a dark, bluish red to a bright scarlet, and all impurities removed. It is then carried back to the left auricle by the pulmonary veins, and from the left auricle it is forced through the mitral valves into the left ventricle, which contracts and forces it through the semilunar valves, at the mouth of the aorta, into the aorta, to be sent to all parts of the body, and again returned to the heart by the veins, to traverse the same rounds as before.

It is easy to see how the arteries, after starting from the heart in one trunk, divide and divide again, like the branches of a tree, and how the veins return, like many little streams flowing into still larger ones, and finally terminating in one large stream; but it is not so easy to see how the blood gets from the fine branches of the arteries into those of the veins. This is effected by means of

The Capillaries.—These are a sort of net-work of little vessels, too small to be seen by the naked eye, which run through every part to which blood goes, and which form the connection between the arteries and veins.

The branches of the arteries frequently unite with each other in their course, and the veins much more frequently; so that if one branch should get clogged up, the other will supply the parts with blood.

The Arteries.—I shall only attempt to give a general idea of the most important branches of the arteries. I shall not burden the reader with their unfamiliar names, but merely indicate their locality.

The great aorta, after leaving the left ventricle, gives off a small branch which supplies the substance of the heart with blood. A little further, and it divides into the anterior, or forward, aorta and the posterior, or hinder, aorta.

The forward aorta divides into two other branches, called the right and left innominate. These give off branches which

go to the breast, neck, head, brain, and fore-limbs. Some of these deserve particular notice.

The left of these divisions is lost in a number of branches, or trunks, which are distributed to various parts of the chest, shoulder, back part of the neck, and left fore-limb. The most important of these branches is the one which supplies the left fore-limb. It is the *axillary artery*, or artery of the armpit. It comes out of the chest, by a sudden turn around the first rib, and takes a direction outward and backward, and reaches the head of the upper arm-bone, and is then called the brachial artery. This artery gives off many branches to supply the muscles of the chest and shoulder. The branch called the humeral passes down the back side of the humerus, or upper arm-bone, giving off branches, and finally divides into three branches, the principal of which continues down the lower arm-bone, until a short distance above the knee, when it divides into two branches, the smaller one passing by the inner and back part of the knee, and terminating in several branches. The larger of these arteries continues on down below the knee, along the principal tendons at the back of the cannon-bone, down to the fetlock, where it divides into three branches. These send off many branches to supply the parts about the pasterns and within the foot.

The right division of the forward aorta is much the largest. It first gives off branches similar to those of the left division just described, to be distributed to the chest, neck, shoulder, and right fore-limb. Its principal division then becomes what is called

The common carotid artery, which passes out at the forward part of the chest, and there divides into

The right and left carotid arteries, which pass up the neck, one on each side of the windpipe, until they reach its upper portion or larynx. Here each carotid divides into two branches, the one called the internal carotid artery and the other the external. The internal is distributed to the brain

and other parts in the head; the external, by its numerous branches, is distributed to the various parts of the head, face, and parts within the mouth. Of its branches, the largest is called the *submaxillary*, which passes forward under the angle of the lower jaw, and at about one-third of the way forward curves across the bone to the outside of it, to go to the face and nose. It is just where this artery crosses the jaw that the pulse of the horse may be most conveniently felt, by grasping the jaw with the hand, and with the points of the fingers under it resting on the artery.

The *hinder, or posterior, aorta* starts from even with the dorsal vertebræ, passes upward and backward to the under side of the spine, with which it lies in contact, as far back as the lumbar vertebræ, where it divides into four large branches. In its course, however, it gives off several branches and pairs of branches. The first two, called *bronchial arteries*, pass into the lungs along with the bronchial tubes, to supply the lungs with blood. The next branch goes to the gullet, sending twigs to parts in its neighborhood. The next are several pairs, which go to the spaces between the ribs. As it passes from the chest into the abdomen, the aorta gives off the large branch which supplies the diaphragm. Further back it gives off one large, short branch, called the *cœliac artery*, which divides into three branches, one going to the spleen, another to the stomach, and the other to the liver.

The next branch starts from the under side of the aorta, passes downward, and divides into from eight to twelve branches, which supply the intestines, and the great folded membrane, called the *mesentery*, which enfolds them. These are called the *mesenteric arteries*.

The *renal arteries* are the next pair. One goes to each kidney. The next are the *spermatic arteries*, which, in the male, go to the testicles; in the female, to those bodies called the ovaries, and the tubes which connect them to the uterus, or womb.

The next are five or six pairs of branches, which are sent to the loins.

Just below the last bone of the loins the posterior aorta divides into two pairs of arteries, called the external and internal iliac arteries.

The internal divides into three branches, which are distributed to the quarters, the rectum, or last gut, and the muscles of the tail.

The external iliac passes from its origin, outward and downward, into the muscles of the inside of the thigh, giving off, in its course, a number of branches, which are sent to the parts through which it passes. After reaching the upper or proper thigh, the main trunk takes the name of *the femoral artery*, which passes obliquely down the haunch, until it comes opposite the head of the lower thigh-bone, or tibia, when it branches into arteries, called the *anterior* (forward) and *posterior* (backward) *tibial arteries*. The latter is the smaller of the two, and passes down the back of the thigh to the hough, where it divides into two branches which supply muscles engaged in flexing the foot. A branch of this artery runs as far down as the lower end of the cannon-bone, and ends in many small twigs.

The anterior tibial artery, near the stifle-joint, gives off the inguinal artery, or artery of the groin, and several other smaller branches, to supply the parts about the joint, and the muscles below it. From the neighborhood of the stifle, it passes down the front of the thigh to the hough, below which it changes its name to *metatarsal artery*, and about two-thirds of the way down the cannon, it gets to the back of the bone, and, a little above the fetlock, ends in three branches, which divide into many small branches, to supply the pasterns and foot.

THE VEINS.

I have described the arteries as starting at the heart and proceeding from it to every part of the animal body, and their use to carry the blood from the heart outward. Now, as the

veins carry the blood *to* the heart, I shall describe them as commencing by their branches and running toward the heart. I shall take up but little space with them, only pointing out a few of the principal trunks. Nearly every artery has its corresponding vein in the same neighborhood. The veins lie much nearer the surface or outside, generally, than the arteries. The walls of the veins are soft, and when the blood is out of them they collapse, or the sides fall together.

The Veins of the Head and Neck.—Important branches run along the bars of the mouth, which are opened sometimes for the purpose of bleeding. Of the branches coming from the face, six from the upper part unite with the *internal maxillary vein*, and eight from the lower jaw with the *submaxillary*. These two unite with the *jugular vein*, or great vein of the neck. Eleven other branches, from the head, neck, and inner part of the shoulder, empty into the jugular vein.

The jugular vein passes from behind that part of the lower jaw which unites with other bones below the ear to form the joint. It then passes back by the side of the carotid artery, to within the chest, where it unites with the vena cava, (anterior or forward vein), which empties into the right auricle of the heart.

There are two jugular veins in the horse, one on each side of the neck. It is the jugular vein which is opened in bleeding, a little way below where the *submaxillary vein* unites with it, and which is about one-third of the way back on the neck, where the vein comes close to the skin.

Another large vein arises from branches within the skull, and passes back along the neck-bones, receiving branches from the deep muscles, and finally empties into the anterior vena cava.

Veins of the Fore-limb.—These commence in the foot by many hundred branches, which are the veins of the frog, sole, and lamellæ, and other parts within the hoof. These unite as they reach the pasterns on their upward course, forming the two branches of the *plantar vein*, which unites with other veins

and passes up, forming the *metacarpal veins*, which pass up the leg, one on each side, until they reach the back part of the knee, when they spread out into several branches, which again come together above the knee, forming two branches, called the *radial veins*, or veins of the arm. The principal one passes up the inside of the arm to the elbow, where it, having received the ulna veins, and a few other branches, unites with the smaller radial vein and forms the *humeral vein*, or vein of the upper arm, which accompanies the artery of this part through the deep-seated muscles to the inner and back part of the humerus, up to where this bone joins with the shoulder. At this place the humeral vein becomes the *axillary vein*, or vein of the armpit, which receives several other branches of considerable size from the muscles of the chest and shoulder, and finally terminates within the chest in the anterior vena cava. There are three other branches which empty into the vena cava. They come from the muscles of the chest and spine.

The anterior vena cava is a short, large trunk, within the fore-part of the chest. It receives, as we have seen, the jugular veins, the axillary veins from each fore-limb, a large vein on each side from the chest, also from the neck, and two other pairs from the region of the withers, and another pair from the muscles of the ribs. The anterior vena cava empties into the right auricle; so, also, does the *coronary vein*, which comes from the body of the heart itself.

Branches of the Posterior Vena Cava.—The innumerable veins within the hind-foot, just as in the fore-foot, pass up to the pasterns, and, by their union, form the *plantar veins*, *external and internal*. These unite and form the principal vein before the hough, the *large metatarsal*, which passes behind the cannon, and by the side of the back tendons, and forward over the inside of the hough. The continuations of its branches above the hough unite and form the *anterior tibial veins*, which receive one other large branch, and pass up between the tibia and fibula to the back of the head of the femur.

The posterior tibial vein results from the union of the *small metatarsal vein* and two others. It passes up the back part of the thigh, and terminates in the femoral vein. The femoral also receives, from the parts below, the medullary, the muscular, and the saphena major and minor.

The greater saphenous vein arises low down on the leg and passes up close to the skin, crossing the inside of the hough, and proceeding up the inside of the thigh to empty into the femoral vein. An enlargement of this vein, as it reaches the hough, constitutes blood-spavin.

The Femoral Vein.—This large vein is formed by the union of the principal veins from below. It runs behind the femoral artery, and ends in the external iliac. In its course it receives several branches.

The external iliac vein, after receiving the femoral, the vein of the groin and of the belly, and another large branch, enters the cavity of the abdomen, to help form the common iliac vein.

The internal iliac vein is formed by the union of two veins, each of which has several branches, coming from the tail, the rump, the parts between the thighs, and about the fundament.

The common iliac vein is formed by the union of the external and internal iliac veins. It also receives three other branches. It and its mate of the opposite side unite under the last vertebra of the loins to form the commencement of the posterior vena cava.

The posterior vena cava passes under the bodies of the bones of the loins, and on into the chest, passing across to the lower part of the right auricle, into which it empties. In its course it receives large veins coming from the loins, the genital organs, the kidneys, the liver, and diaphragm.

The blood from the digestive organs is carried from them by a great number of veins, uniting in one common trunk, called the *portal vein*, and which empties into the liver. It undergoes in the liver a purifying process, and is then carried on to the vena cava by the vein going from the liver to it.

I have thus described the general outlines of the distribution of the blood-vessels, but there are thousands of twigs of arteries and veins I have not mentioned. I have spoken of three kinds of blood-vessels—the arteries and veins, and the fine net-work of capillaries (hair-like vessels) connecting them. It remains to point out the uses of the circulation of the blood, for which these vessels are designed. But, before proceeding to this subject, I will remark that the heart, which is the central organ of the circulation of the blood, is subject to several diseases, as softening of its walls, thickening of the same, inflammation, both of itself and investing sack.

The large arteries near the heart, and also their valves, are liable to become changed into bone or cartilage. The walls of arteries sometimes become partially broken, giving rise to large pulsating, or beating, tumors, called *aneurisms*.

The veins are liable to inflammation, which is sometimes caused by bleeding. They may become ruptured or broken. They are also liable to become enlarged, as in blood-spavin, etc.

Both arteries and veins may be cut by accident. If an artery is cut, the blood flows in jets, and is of a bright color; if a vein, the blood runs in an even stream, and is of a dark color. (For proper treatment see the article on "Wounds.")

CIRCULATION OF THE BLOOD.

"Of the flesh the blood is the life thereof." It contains every thing that is necessary for building up and repairing every part of the animal body, from the hardest bones to the softest parts of the system. It is in the form of a fluid of a red color. Its redness depends on what are called the red corpuscles. As the blood circulates through the capillaries, it loses the oxygen which it took up in the lungs, and becomes charged with carbonic acid gas and other impurities, and changed to a dark color. It is then carried on to the heart by the veins, and from there sent to the lungs, where the carbonic acid, and some other impurities, are given off, and the

blood again charged with oxygen, and becomes of a bright scarlet color. If the carbonic acid, which the blood takes up as it circulates through the body, were not thrown off, death would soon take place. Neither could life continue for more than a few seconds if oxygen were not mixed with the blood in the lungs. Now, oxygen is one of the two gases which are mixed together to form the air which all animals breathe. It is called vital air. If the air which the animal breathes is not fresh and pure, there will not be the proper quantity of oxygen taken into the lungs, and the animal must suffer from its want. Hence the importance of keeping stables clean and supplied with fresh air. The blood contains every thing necessary for repairing the worn-out parts of the body, and which, as it flows through the system, are deposited, or left, exactly where they are needed. But, it may be asked, where does the blood get these particles fit for supplying this waste? It gets part of them from the food; after it is digested in the stomach, and as it passes through the bowels, it is absorbed into the veins. Also, the worn-out particles of the system are taken up by a set of vessels called lacteals, and by them carried back into the blood, and again fitted for the repair of the body. But those parts that have become utterly unfit for any purpose are thrown off from the body by the bowels, skin, lungs, or kidneys, in the form of dung, sweat, or perspiration, gases, and urine, or water.

The quantity of blood in the animal is generally about one-fifth of his weight. The blood contains several different parts, of which water is the largest. But the most important are the red corpuscles, albumen, and fibrine. The white of an egg is albumen, but that in the blood is thinner. Fibrine is a white, stringy substance. It may be obtained by taking a switch and stirring a clot of blood, and then washing it. It is, in its natural state, a liquid, but as the blood cools, it becomes solid little fibers, or threads, which cause the blood to clot.

The heat of the animal body is mainly dependent on the

changes which take place by the agency of the blood. The oxygen which the blood carries from the lungs unites with carbon in the system and creates heat, just as the oxygen in the air unites with the carbon in the wood and produces heat in our fireplaces. There are many other interesting things connected with the consideration of the blood, but the purpose of this work will not permit their further consideration.

THE LYMPHATICS.

I HAVE already described two sets of vessels distributed through the body, but there is yet another set of somewhat different character. They are called lymphatics, and contain a fluid called lymph, which they secrete from the parts through which they pass. They present the appearance of a knotted string, or a tube composed of innumerable short joints. They frequently unite with each other, as the cords composing the meshes of the fish-net. There are also places where a great number of these vessels unite in one place, forming a considerable knot, called a gland, or lymphatic gland. From these glands other vessels depart and continue their way forward. There are main channels of the lymphatics, as of the arteries and veins, and by them the lymphatic fluid is carried on to the great channel which passes forward beneath the spine, to be emptied by it into the left axillary vein, not far from the heart, by which means this fluid is mixed with the blood.

The lymphatics of the fleshy part of the body are arranged principally in two layers—one layer near the skin, the other deep in the muscles. Each of the internal parts is supplied with lymphatic vessels.

The lymphatic glands are more numerous along the jaws, neck, flanks, and in the folds of the membrane which surround

the intestines than in other parts. These glands are diseased in farcy, and the enlargement of those near the skin constitutes farcy-buds. These vessels take up any fluid that may be thrown out by the blood not necessary for repairing the system, as also the worn-out particles, and absorb from the bowels a part of the digested food passing through them.

RESPIRATORY, OR BREATHING, ORGANS.

THESE are the larynx, the windpipe, the bronchial tubes, and the lungs. But I shall describe under this head the pleura, which is only indirectly concerned in breathing.

The larynx is situated in the throat at the upper part of the windpipe, between the back part of the sides of the lower jaw. It is the beginning of the air-passages. It is composed of five pieces of cartilage, bound together by ligaments and membranes, forming a cavity of considerable size, which is continued back into the windpipe, and opens forward to admit the air from the back openings of the cavities of the nose. Its forward opening is called the *glottis*, which is a long slit, or opening, about six times as long as it is wide. It has two slips of membrane attached to the back part, by which it is drawn tight or left loose. The glottis is covered by the *epiglottis*, which is a cartilage fitting over it like a lid, and which raises to admit air, but closes against any thing solid.

The glottis and the cords spoken of, called vocal cords, are the principal agents in producing the voice. But the whole larynx is somewhat concerned in producing the voice.

The windpipe, or trachea, is a tube of about twenty-five or thirty inches in length. It extends from the larynx back along the lower part of the neck between the two first ribs, and terminates in two branches, called the bronchial tubes, under the

curve of the great artery leading backward. The trachea is composed of about fifty or sixty rings of cartilage, so united as to admit of considerable motion without interfering, to any considerable extent, with the size of the tube. This is evident when we consider the degree of motion the horse's neck is capable of.

The bronchial tubes are the two branches into which the wind-pipe divides. The right goes to the right, and the left to the left lung. After reaching the lungs, the right bronchial tube divides into three principal branches, and the left into two. These branches continue to send off branches which divide and subdivide in the lungs until the little branches become so small as not to be visible to the naked eye. As these bronchial divisions, or ramifications, proceed, they lose more and more of the character of cartilage, and become very thin, and finally appear to be only a continuation of the inside lining mucous membrane, which finally ends in a closed sack of less than the size of a millet-seed. These little sacks are called *air-cells*.

I have just spoken of *the mucous membrane which lines the air-passages* from the larynx down through the trachea, bronchial tubes, and bronchial ramifications, or divisions, and which finally ends in the little sacks called the air-cells. This membrane secretes mucus for the protection of the air-passages. When irritated, as in colds, its secretion of mucus becomes much increased. This membrane is liable to inflammation, and this may begin in any of its different parts. When it starts in the larynx, the inflammation is called laryngitis; in the bronchial tubes, it is called bronchitis.

The lungs, or lights, are two large, spongy bodies of a pinkish hue, one situated in the right and the other in the left side of the chest. The right is the larger of the two, and is composed of three divisions, or lobes; the left is the smaller and only divided into two lobes. They are separated from each other by the heart and a broad fold of the pleura, called the *mediastinum*. They are held in place by blood-vessels, the division of the

windpipe, and that part of the pleura which divides the chest. They are of much the same shape in all larger animals, being exactly suited to the cavities in which they lie.

The lungs are composed of the branches of the bronchial tubes, the air-cells, and the branches of the arteries and veins of the lungs, all of which are held together by a spongy, whitish, cellular substance, called the parenchyma. The capillary vessels of the lungs are very numerous. Those forming the connection between the branches of the pulmonary arteries and veins are spread out over the air-cells, forming a complete net-work envelope for them. By this arrangement it will be seen that every particle of blood brought to the lungs by the pulmonary artery must pass over the surface of the air-cells, before reaching the pulmonary veins to be carried back to the heart. Now, the walls of the air-cells and capillaries are so thin as to allow the poisonous carbonic acid, which the blood gathers up in its course through the system, to pass out, and the oxygen of the air to pass to the blood and again fit it for sustaining life.

The change which the blood undergoes in the lungs is absolutely necessary to sustain life. This change is called the *arterialization* of the blood. It consists in freeing the blood of carbonic acid gas, and charging it with oxygen, and which causes its color to change from dark to bright scarlet. If this change did not take place, life could last but a few seconds.

The arteries and veins which carry blood to build up and repair the substance of the lungs, pass through them just as those of other parts.

The *pleura* is a thin, tough membrane, which lines the inside of the chest over the ribs and diaphragm, and is also spread over the lungs, and a broad fold of it dips down between them, forming the partition between the two sides of the chest. The pleura, as it is spread over the ribs, diaphragm, and lungs, is fastened to these parts. Its free sur-

faces, which lie in contact with each other, are of a bright, glistening, whitish color, and throw out a secretion which moistens them and prevent friction, or rubbing. That part of the pleura which lines the ribs is called the *pleura costalis*, or pleura of the ribs; that which envelopes the lungs is called the *pleura pulmonalis*, or pleura of the lungs. The use of the pleura is to hold the parts within the chest in their proper place, and to enable the motions of the ribs, lungs, and diaphragm to be performed with ease and freedom from friction.

The lungs are liable to inflammation, which is called pneumonia, or lung-fever. They are the seat of consumption. The pleura is the seat of pleurisy. Pleurisy is an inflammation of the pleura.

The capability of the horse for service depends greatly on the capacity of the lungs. The size of the lungs is judged of by the depth, length, and breadth of the chest. No horse with a contracted, diminutive chest can long endure the service for which a horse is valuable. No organ so much contributes to long life as the lungs. In fact, an animal can not attain great age without large, healthy lungs. It is, then, of the first importance to the farmer to secure a stock of horses with well-formed chests, and known to have healthy lungs.

THE BRAIN AND NERVES.

THE brain is situated within the skull. It is a soft, whitish substance. It is divided into three parts—the greater brain, called the *cerebrum*, the lesser brain, called the *cerebellum*, and the large head of the spinal cord, called the *medulla oblongata*. The brain is the seat of the mind and

source of action. It is invested with three membranes, the outer one being very dense and tough, and attached to the inside of the skull. The second membrane lies close to the brain, and is attached to it by many little blood-vessels. The third is a very fine substance, like spider's web.

The spinal cord is a continuation of the medulla oblongata back through the whole length of the spinal canal. It is commonly, but improperly, called the spinal marrow. It is invested by the same membranes that the brain is.

The nerves are round cords which arise in pairs, or by twos, from the brain and spinal cord, and which connect them with all other parts of the animal. There are forty-six pairs of nerves. Of these, ten pairs arise within the skull and thirty-six from the spinal cord. The nerves are composed of similar substance to the brain, and invested by a tough membrane. Most nerves divide into many branches, like blood-vessels, until the branches become so fine as to only be seen by the aid of the microscope.

Of those that arise within the skull,

The first pair, or olfactory nerves, are distributed over the inside of the nose. They are the nerves of the sense of smell.

The second pair, or optic nerves, pass, one to the back part of each eye. They are the nerves of sight.

The third pair, or movers of the eyes, pass to the muscles of the eyes, and influence their motions.

The fourth pair pass to the superior oblique muscle of the eyes.

The fifth pair have many divisions distributed to many parts of the face, head, jaws, and inside parts of the mouth. One branch of these nerves goes to the tongue, and gives rise to the sense of taste.

The sixth pair pass to some muscles of the eye.

The seventh pair are distributed chiefly to the ear, and are the nerves of the sense of hearing. They are called *auditory nerves*.

The *eighth pair*, called *par vagum*, is divided into many branches, which are sent to many muscles of the head and neck, to the windpipe, the gullet, the lungs, the heart, the stomach, etc.

The *ninth pair* are principally sent to the muscles of the tongue.

The *tenth pair* are distributed to the muscles of the head and neck.

The nerves given off from the spinal cord are thirty-six pairs. They are all nerves of motion and sensation, or feeling. One pair is given off at each bone of the spine, seven from the neck, eighteen from the back, five from the loins, and five from the sacrum, or rump-bone, and one pair from the coccyx, or tail-bones.

The nerves are sent, by their branches, to every muscle of the trunk and limbs, and through them there is a communication with the brain.

In addition to these nerves, there is one great system, called the *sympathetic nerve*. This is a very extensive nerve, communicating with all the internal parts, and with the head, neck, chest, quarters, and abdomen, or belly. It communicates very freely with the other nerves. It brings all parts of the system in sympathy with each other.

Some nerves are under the control of the will, and called voluntary nerves. Some, called involuntary nerves, act entirely independently of the will. Some are only partially under the control of the will. The nerves which supply the muscles of the limbs are examples of voluntary nerves. Those which supply the heart, ear, and bowels are examples of involuntary nerves. Those concerned in breathing are partially under the will.

THE SKIN.

THE skin, or hide, is a thick, elastic structure, which covers the entire frame of the animal. Its uses are numerous and important. It is a protection to the parts beneath it against external violence, and preserves the due form of the body. It is the seat of millions of little glands and tubes, or pores, which are named according to the purpose they serve. The glands are the sebaceous or oil glands, and the pores, or tubes, are the sweat or exhalant pores, the absorbent pores, the pores which throw out the oil secreted by the oil-glands. The true skin is also penetrated by the hair-bulbs from beneath, and from which, on arriving at the cuticle, or scarf-skin, the hairs arise. The skin is also penetrated and traversed by numerous blood-vessels and nerves.

The skin, or hide, is composed of three different layers, named from within outward—the cutis, or true skin, the rete mucosum, and the cuticle, or scarf-skin.

The cutis, or true skin, constitutes the main bulk of the hide of the animal. It is chiefly composed of a fibrous structure, with many little vessels and nerves passing through it. It is very tough and elastic, and highly sensitive, as shown when it is exposed by the removal of the parts covering it, as in chafing by the collar or when a blister has been applied. It is the part of the hide which, when tanned, is leather. It is of different thickness and density, or solidness, on different parts of the animal, and on some parts is drawn very tight while it is quite loose on others. It is capable of adjusting itself to the greatest extremes of the horse's condition, fitting him with equal exactness in the best order and when poorest in flesh. It is of very different degrees of thickness in the different breeds of horses—thin and sensitive in the blooded horse, and quite thick in the coarser breeds.

The numerous little glands spoken of are seated in this part, and from them arise and pass outward the pores before

mentioned. It is also penetrated by the hair-bulbs, or roots. The true skin is attached to the body by means of the cellular tissue, described under its name elsewhere. Over a great part of the body it is attached to a muscle peculiar to quadrupeds, called the "*panniculus carnosus*," and which enables the animal to shake flies and other offending objects off the body.

The *rete mucosum*, or middle layer of the skin, is a thin, soft, web-like structure, which, in different animals, and sometimes in different parts of the same animal, is of different colors, and which gives the color to the animal. This is one of the most curious things in nature. The pores, which have their origin in the true skin, pass through the *rete mucosum* on their way outward.

The *scarf-skin*, or outer layer of the skin, called the *cuticle*, is a tough, thin, transparent membrane covering the other two layers of the skin. It is without sensibility, and serves as a protection to those parts of the skin which are sensitive. But for its presence the slightest touch would cause much pain. It is the cuticle which is raised in drawing a blister. It is composed of an infinite number of small scales, somewhat resembling the scales of a fish, and similarly arranged. The direction in which these scales lie determines the direction of the hair on the different parts of the animal. The cuticle is produced by the true skin, and is perforated by all the pores which arise from it, and which are its means of attachment to the true skin. The dandruff, or scurf, which gathers on the horse's hide, is only the worn-out scales of the cuticle.

The nerves of the skin do not enter the scarf-skin, but their fine extremities are, perhaps, in contact with its under surface.

GLANDS AND PORES OF THE SKIN.

These have already been spoken of, and their origin in the *cutis*, or true skin, pointed out; but their importance demands a more careful consideration of their structure and uses.

In the true skin there are found many little glands, each

having a little tube, or pore, proceeding from it, passing out through the rete mucosum and cuticle, and ending on the surface of the animal with an open mouth. As before remarked, there are three kinds of these glands and pores.

The sweat-glands and pores, of which the skin of the horse will present many millions, throw off by far the greater part of the worn-out particles of matter of the animal body. The worn-out matter is separated from the blood by the sweat-gland, and passes off through the sweat-tubes in the form of vapor, called insensible perspiration.

The pores of the skin have the power of becoming larger and smaller, as circumstances require. Heat or vigorous exercise causes them to open, for then a very rapid waste of the system takes place. If, when in a state of active perspiration, from whatever cause, the animal becomes suddenly cooled, the pores of the skin will close up, and the worn-out matter, no longer being able to pass off through the skin, seeks an outlet in some other way. It is thrown on the lungs, bowels, or kidneys, and the consequence is pneumonia, pleurisy, cold, inflammation of the bowels, kidneys, etc.

The Oil-glands and Oil-pores.—The oil-glands are situated in the true skin. They are not so numerous as the sweat-glands, and are much more numerous in some parts of the body than in others. Each gland has a little tube, duct, or pipe leading from it, and terminating in the open mouth, or pore. Most of the oil-pores open on the surface of the animal; but some of them open into the sheath of the hair, supplying it with a hair-oil of nature's own manufacture.

The purpose of this oil is to keep the skin in its naturally soft, pliant, and elastic condition—to protect it from the irritation which the wind and rain and the sweat and vapor, thrown off by the sweat-pores, would produce. Being an oil, it cools slowly, and is a great protection against the chilling of the hide by cold.

Around the border of the eyelids it serves to keep the tears

from running over. In the ears it is very abundant, and forms the earwax. It is most abundant at the heels, which are so much exposed, and in which the skin is in such constant use. In the disease known by the name of "grease," this oil is thrown out at the heels in great quantity and in an unhealthy condition.

The Absorbents of the Skin.—The skin, as well as most other parts of the animal's body, is supplied with a sort of web of little vessels, or apparently jointed tubes, which are called the absorbents, whose open mouths, or pores, lie immediately under the cuticle. They are called absorbents because they have the power of soaking up, or absorbing, substances, and carrying them into the system. They are capable of taking up water or the confined sweat or perspiration, and even some medicines applied to the skin, and carrying them into the system.

THE HAIR.

The hair is a thick coat, or covering, provided by nature for the horse, to protect him from harm, from the severity or changes of weather, season, or climate, and to give him that beauty for which, in a great part, he is so much admired. The hair is an appendage of the skin. It consists of a horn-like outside covering, called the bulb, which surrounds a softer interior, pith-like substance, called the pulp. The root of the hair is surrounded by its sheath, which starts from the cellular membrane beneath, and passes up through the true skin, and which terminates at the surface in an open mouth, through which the hair passes out. The hair grows from the bottom of the cup-like sheath in which it stands, and is not attached to it at any other place.

There is no difference in the way the hair is produced on the different parts of the animal. The hair of the mane and tail only differ from that of the body in being longer, stronger, and thicker.

The appearance of the hair is a very important indication

of the condition of the horse's system; for disease can scarcely exist in the animal without interfering, to some degree, with the healthy action of the skin, and the least degree of trouble with the skin will be shown by the appearance or feel of the hair.

That the hair may be kept in its proper glossy, soft condition, it is necessary that the horse's health must be good, that he be properly stabled, that the hide be kept perfectly clean, and that the hair be frequently rubbed, so that the oil poured out around its roots may be evenly distributed over the hairs, and any excess of it removed.

Shedding or molting are terms applied to a change which takes place with the horse's coat once every year, generally in the spring, but sometimes twice a year, in the spring and fall both, in which the old hair, except the mane and tail, falls off, and is replaced by a new crop. This change from the winter to the summer coat takes place gradually, requiring, in a horse in fair condition, from two to three weeks to complete it. The young hair starts up from the same point of its predecessor, and passes up by its side, and is some length before the old hair is cast. By this arrangement of nature the horse's coat is suited to the different seasons, being thick and warm in the colder seasons and light in the warmer.

While this change is going on, the skin is undoubtedly in a state of increased activity. Hence the horse sweats easily; a greater than ordinary amount of dandruff is thrown off from the skin; the nostrils look more florid than usual; the fatness of the horse decreases; his appetite is poor, and his nervous system depressed. These conditions are often mistaken for disease, and the horse subjected to treatment for fever, inflammation, debility, or dosed with some nostrum "*said to be good*" for every thing. I need hardly say that all this is not only unnecessary, but very injurious.

The process of shedding is one of those changes in the system which nature has established, and if the horse is in health

at the time it takes place, no evil will result from it. The only thing necessary is to see that the horse has proper food, which should be, for this time, of a kind easily digested, and not quite so much in quantity as usual. He should be frequently rubbed, and but moderately brushed, and the curry-comb should not be used on him at all. The thin coat will not permit harsh raking.

He should not be worked hard, nor in any way overexerted; for the thinness of his coat, at this time, and the greater activity of the skin will certainly render it much easier for him to take cold. Spices, undoubtedly, will hasten the process of shedding, but they are unnecessary, and may do very great mischief. They should not be given. If, however, the horse does not shed at his proper season, it will be owing to some existing disease or ailment. A careful examination will discover it, and the proper treatment should be made use of to cure it.

Clipping or shaving the hair, to give the horse the appearance of a thin coat, is sometimes practiced. It certainly does the horse no good, and may prove decidedly injurious to him. It is one of those instances in which man "imitates nature abominably."

COLOR.

The color of the hair is produced by the middle layer of the skin, called the *rete mucosum*. It affects the health of the horse only in so far as horses of certain colors are generally hardy, while those of other colors are soft and washy. Some colors also seem to be peculiarly liable to certain diseases. But the color has much to do in determining the value of the horse in market, and hence its consideration is of peculiar importance. Almost every color has at times been fashionable. But there are some colors which, though they may at times be out of fashion, are never out of good taste with good judges and common-sense people.

Horses may be found of almost every imaginable shade of color, but there are a few general types of color, to some one of which every horse may be regarded as belonging. These I shall now consider.

The White Horse.—There are but few originally white horses. Light-gray colts, that have but little dark mixture about the joints, generally begin to become white before they are full grown, and from them we have one stock of white horses. White horses are, generally, very teachable and of good disposition. They are of good size and well made, but are not the best for standing hard labor. Their hoofs, being white, are, of course, tender and liable to contraction. They do not command the highest prices in market, unless for some particularly good quality.

The Gray Horse.—There are several kinds of grays, the silver-gray, the iron-gray, and the dapple-gray being the principal. They are large and strongly built, and many of them are lofty and quite handsome. They are good carriage-horses. Their defect is their feet, which are liable to contraction.

The Roan may be said to be only a medium horse in size, strength, action, and endurance, though many of them, in Kentucky and the North-west, having something of the French type, excel in all these qualities except size.

The Chestnut.—The lighter varieties are usually rather lightly built, of good spirit, but deficient in endurance. The dark chestnut is truly a noble animal, of great strength, spirit, and endurance, and almost a stranger to disease. He will sell in any market readily.

The Bay is the richest and most beautiful of all the different colors of the horse. The bright bay, with no white, and black from the knees down, with black mane and tail, is the most durable, the best-spirited, and the soundest of all colors.

Such a horse shows splendidly in any place he may be put; and whatever color may be the popular one, the bay will never be below his proper value. The lighter bays are good, but not so elegant.

The Brown is only a deep shade of the bay, and though not so bright and lofty, possesses many of the excellent qualities of that color.

The Black is a horse of much beauty, and, from his lofty carriage and buoyant spirit, seems to rejoice in his true nobility. He is a horse of great strength, well-formed body, and suited to many purposes. He is a favorite of military men, who are fond of the pomp and circumstance of the parade, for which his high action suits him so well. The black is said to be more liable to disease, blindness, and vice than any other color, though he stands well in market, and sells at the best prices.

I have only presented a few of the leading ideas on color. They may serve to direct attention to this very interesting part of the horseman's and the farmer's study. A horse with all other good points should not be condemned on account of a bad color. But I would say to the farmer, avoid mongrel colors, as flea-bitten grays, piebalds, claybanks, blue, dun, etc.

THE FOOT.

THERE are but few parts of the horse to which less attention is generally given than to the foot, unless, indeed, the vital organs or parts be excepted. The old adage that "a borrowed horse has hard hoofs" appears to have given place to a different idea, that every horse's hoofs can stand unlimited abuse; but, after an examination of the structure of the foot, which every farmer and blacksmith should study and understand, it

will be seen that, though it is well calculated to stand an immense amount of service, it is also susceptible of great and oftentimes irreparable injury. If the owner of the horse would consider that a horse without legs is worse than no horse at all, and that good feet are quite indispensable to good legs, and that ears, eyes, and tail may be better dispensed with, he will be likely to appreciate and take better care of his horse's feet. •

In a work intended for popular use, in which so great a number of subjects have to be considered, it can not be expected that a minute consideration of every thing relating to the foot can be given. This, of itself, has constituted the material for a considerable book. The principal parts of the outside of the foot are, the outside case, or hoof, composed of the wall or crust, the sole, the bars, and the frog. The principal internal parts of the foot are, the coffin-bone, the navicular or shuttle-bone, the coronary substance, the sensitive sole, the sensitive frog, and the lamellæ, together with certain ligaments. Each of these parts I shall now explain separately, first remarking, however, that the different parts of the hoof are so firmly united that they can not be separated or taken apart until the hoof has been soaked in water for a long time. It then separates easily.

The crust, or wall, of the hoof constitutes that part which can be seen when the horse stands before us. It gives form to the foot, and its lower border, to which the shoe is nailed, is the principal part that comes in contact with the ground. It is somewhat difficult to describe, but I shall endeavor to illustrate its shape. If the bark is stripped off a stick, as a boy makes a whistle, and this bark is cut slantingly across, as the boy cuts it for the mouth of the whistle, and again cut across, commencing a little forward of the air-hole of the whistle exactly opposite the beginning of the slope at the other or lower side, and cutting it across not so slantingly as at first, but so as to come out very near the lower side of the other cut. Now, set this

piece of bark down on the longer slope, and cut it through at the thin side, where it is already nearly in two; then bring these two ends of this cut ring into the middle of the ring, hold them there, but, instead of letting them curve gradually in, break them at the place they start to curve in, so as to form a V-shaped notch at the back of this ring. You thus have an exact representation of the form of the outside crust, and of its two reflections inward to form the bars, the two sides of the V-shaped notch representing the bars.

For description and reference, the wall is divided into the toe, which embraces the front part of the wall, nearly all of it that is seen when the foot stands immediately in front of the observer. It is the deepest and thickest part of the wall. When the hoof is prepared for the shoe, its depth from the edge of the hair to the tip of the toe measures about three and a half inches. The slant backward is at an angle of about forty-five degrees, or just half-way between level with the ground and straight up. Its thickness is from three-eighths to half an inch.

The quarters lie between the toe and the heels; they form the lateral (to the side) projections of the wall. Their height is not so great as that of the toe, being from two to three inches, and from one-fourth to three-eighths thick.

The heels are the shallowest, narrowest, and thinnest parts of the crust. They form the back part of it, extending from the quarters to where the crust is turned or inflected inward to form the bars. Their depth is from one and a half to two inches. Their thickness is about one-fourth of an inch, the outer one being a little the thickest.

The bars are continuations of the wall, turned shortly in at the heels toward the center of the foot, where they meet. They separate the sole from the frog, their inner edge forming a ridge or prominence on the inside of the foot, and their outer edge forming the prominences or ridges running from the heels toward the middle of the bottom of the foot. (See cut, p. 419.)

The *lamellæ* are little, exceedingly thin plates of horn, one-twelfth of an inch broad, and varying in length from two inches to less than half an inch. Their sides and free edges rival in polish the finest spring that human skill can form. They are attached to the inside of the crust by one of their edges, and arranged in almost perfectly parallel lines from the upper and inner border of the crust to the point of its union with the sole. They continue around on the bars, but becoming shorter and shorter until they are entirely lost sight of. Each lamella stands free of itself, the spaces thus formed receiving the corresponding sensitive lamellæ covering the coffin-bone. The number of horny lamellæ have been estimated at five hundred, and the surface their sides present at two hundred and twelve square inches, or nearly one square foot and a half; but, from an imperfect calculation of the lamellæ of a foot before me, I am inclined to the opinion that the above estimate is entirely too low. By these delicate leaves of spring, which very much resemble the under side of a mushroom, and their corresponding lamellæ covering the coffin-bone, (at letter *c* in the above cut), almost the entire weight of the horse is sustained; the great concussion which, but for this, would occur to the other parts within the foot, is prevented, and the horse is enabled to glide along: at the speed of five or six miles an hour, with the most perfect ease to himself and his rider. In these lamellæ of the horse's foot, we have a most magnificent illustration of the wisdom of the Creator, which we are so often led to contemplate and reverence in the examination of the animal economy. How wonderful are the works of God! How boundless his designs for the good of his creatures!



VIEW OF FOOT,
Showing one-half the
hoof cut off, and show-
ing the lamellæ.
a, Part of hoof left on.
b, Hoof cut off,
showing the lamellæ
called springs.
d Represents the
sole left bare.

The superior border of the crust is not square across, but all the way round from one heel to the other it is as if shaved out, just as a cooper shaves the ends of the barrel-staves out to let

the head into the chime or groove. This shaving out of the upper end of the crust is a little concave, or hollowed out, and furnishes the bed in which the coronary ligament lies. The upper edge of the crust of the hoof, above the hollowed-out place just described, is soft and yielding horn. It is also marked by a little groove dividing it into two edges, all the way around the border. The true skin is attached to the inner one of these divisions, and so gradually does the skin seem to change to horn that it is difficult to tell just where the one quits and the other begins. The scarf, or outside scaly skin, is attached to the outer, or outside, one of these divisions, and is lost in the horny matter just as the true skin is; but the horny matter in which the scarf-skin is lost is whitish and scaly, and around the fore-part of the wall only extends a little below the hair; but a little further down on the quarters, and still further down on the heels and across the frog, where it is nearly an inch broad, it forms a perfect band around the hoof, and its office is, probably, to protect the young horn which starts beneath it. Its fibers run in the same direction as those of the wall, and it can only be separated from it in the colt's foot, or after macerating (soaking) the fully developed hoof. This band has been called the *coronary frog-band*. This covers the true coronary border of the hoof, and is connected with it by its fibers.

The inferior border of the crust, or wall, is that part which projects below the sole, and is the part on which the foot rests. It is also the part to which the shoe is nailed. From its use it is subject to great wear, and this is ordinarily sufficient to compensate for the growth of the wall from above. It is thicker around the toe than the quarters, but rather heavy at the heels where the crust turns in to form the bars. If not worn off, trimmed, or broken off, it will grow out in very ridiculous shapes. This part needs to be well understood by the blacksmith.

The sole is an arched plate of horn, constituting that part of the floor of the foot bounded by the wall, or crust, and its in-

ward inflections, the bars. When macerated and removed from its connection, it will be seen to present a toe, bounded by the toe of the wall; a middle, or central part, which lies immediately around the point of the frog; the two heels, or points, which are received in the spaces between the quarters and the bars; and two surfaces, the upper and lower. The inferior surface is concave, (hollowed out), the degree of concavity being greater in some horses' feet than in others; also, greater in the hind-feet than in the fore ones.



VIEW OF THE
SOLE, OR UNDER
PART OF THE
FOOT.

a a, The frog, which is often cut too low.

b, The sole.

c c, The bars, which never should be pared down, as is the custom of blacksmiths. (See article on "Shoeing.")

d d, Crust of hoof, the seat of the shoe.

The superior surface of the sole is convex, (rounded), and corresponds with the inferior surface. It is not perfectly uniform in its convexity, but a little more elevated at certain places than at others. It is marked by numerous very small holes, which are made by the little projections, called villi, from the sensitive sole, and from whose orifices, or mouths, the horn of the sole is secreted, or thrown out.

The thickness of the sole, in its natural state, is said to be about one-sixth of an inch, but it is thicker in some parts than others, the thicker parts being near the union with the bars and the heels, that part near the union with the walls being the thinnest.

The frog is the spongy, wedge-shaped body which occupies the space between the bars, giving prominence and support to the back part of the foot. (See *a a*, in cut.)

The frog is divided, for description, into two surfaces, the superior and inferior, or upper and lower; two sides, a point, or toe, and two bulbs, or heels. These divisions are not naturally very well marked, but are very convenient for reference and description. Turning the bottom of the foot toward us, we observe two deep grooves, one starting at each of the heels of the crust, and running toward the center of the foot, but gradually becoming shallower as they pass forward, and finally

becoming quite imperceptible by the time they reach the point of the frog. These grooves, called *commissures*, are formed by the outer sides of the bars and the sides of the frog.

Still holding the bottom of the foot in the same position, the frog will be observed to be divided at the large end, or head, of the wedge, by a deep cleft, split, or fissure, which extends forward about half the length of the frog. This cleft divides the posterior (hinder) half of the frog into two rounded, elongated prominences, or bulbs, which are called *the heels* of the frog. These are the most prominent parts of the frog, and assist in supporting the weight of the horse. They are embraced by the heels of crust, and covered behind by the thicker and deeper part of the coronary frog-band, which has before been described.

The toe of the frog, or that part forward of the cleft, is the anterior, or forward, half of it. It is rounded and narrowed as it passes forward to the point. It has a prominent swell on it immediately beneath the shuttle-bone, which has been called the cushion of the frog, never to be found again after once pared off. The toe is composed of very dense horn, and is very rapid in its growth. Smiths make very free in paring it off.

The sides of the frog form the posterior, or hinder, walls of the deep grooves which bound the frog, and which are called, in scientific language, *commissures*. The sides, by their upper border, are dovetailed into the upper border of the bars, by lamellæ, and firmly glued together.

Turning the sole over, with the frog in place, and viewing it on its upper surface, it will be seen that wherever the lower surface is raised into an eminence, the upper surface is sunk into a groove, and wherever the lower surface is marked by a groove, there is a corresponding eminence or ridge on the upper surface.

Immediately above the cleft, on the upper surface, a broad, flat, strong promontory, or process, arises. The base, or bot-

tom, is exactly over the cleft, and the same length. The breadth of the base, also, is about the same as the breadth of the cleft. It rises higher than any other part of the bottom of the foot. The forward edge is nicely rounded, and inclines backward at about the same angle with the wall of the hoof. The upper edge, or top, of the process is thinner than the base, is only about half as broad, and is smoothly rounded off. The back edge corresponds with the groove of the cleft, rising up between the heels of the frog. This high process is composed of very tough horn, and has been called the *frog-stay*.

On each side of the frog-stay there will be seen a deep groove, or ditch, corresponding with the two heels of the frog, starting and running forward toward the center of the foot, and uniting in one channel in front of the forward edge of the frog-stay, and at which point the bottom of the groove makes a slight dip, corresponding with the cushion of the frog; it then becomes rapidly shallow, and terminates, or ends, a little forward of the middle of the foot. These grooves, or ditches, sink down around the frog-stay, considerably below the curvature of the bottom of the sole. They are bounded by the frog-stay on their inner side, and by the sides of the frog, which rise up to unite with the bars, on their outer sides.

DEVELOPMENT OF THE HOOF.

Some months before the foal is born, the foot will be found to present the appearance of an elongated soft and slightly elastic ball. In place of the hoof will be found a white substance resembling cartilage, but more of the character of skin. That which supplies the place of the wall is thin, and is continuous with the skin; that supplying the place of the sole is very thick, and is produced by the sensitive sole under it. This is so thick as to present no outline of the bottom of the foot, but projects out like a ball, or the end of an egg.

These structures are only temporary or provisional. Pretty soon horn commences to form under the temporary wall. It

descends in plates from the coronet to the lower border of the wall. This growth of horn progresses until the horny wall is fully formed.

The growth of the horny wall has progressed considerably before the horn of the bottom commences to be formed. It commences to form beneath the temporary bottom, and, by the time of birth, the sole, frog, and bars will be formed, but covered by the thick substance of the temporary bottom. But this soon becomes loose in its texture, and breaks off, so that in a few days the sole and frog are visible. This cover is for the purpose of preventing the hoof from hurting the dam. In the description of the wall I have already spoken of the upper border being as if shaved out for the purpose of receiving the coronary substance, which will hereafter be more fully described; but its office must here be spoken of. On the side which lies in contact with the wall there are an infinite number of little points, or mouths, of vessels, called villi. These villi have the power of changing the blood, or parts of it, with which the coronary substance is abundantly supplied, into a peculiar, soft, gluey matter, which becomes changed into true horn as it dries. This gluey matter is poured out from the villi in the form of fine, tube-like hairs, and which descend from the point of their origin in perfectly straight lines to the lower border of the crust, or wall. They are quite soft near their origin, but get harder as they descend. Hence we see that the crust of the horse's foot is made up of a vast number of little tubes, with their sides firmly glued together, so as to present the dense structure it appears to be. These little tubes, or fibers, of horn are arranged in layers, or growths, giving the appearance of a grain to the horn. The coronary frog-band spoken of protects the horn at its origin until it descends far enough to become sufficiently hard to not need this protection. When, from age, heat, exposure, or disease, this coronary frog-band embraces the soft horn beneath it too tightly, it causes the horn to pass out below it, not smooth, as it should be, but

marked by ridges, or waves, running in rings around the hoof, and sometimes causing ridges, or grooves, running up and down the hoof.

The sole is produced by the villi which bestud the under surface of the sensitive sole, which will be hereafter described. It is produced in the same way that the wall is. Its fibers, or tubes, take an oblique direction forward, following the same slant of the wall of the foot. Its fibers are finer, and it is softer and more elastic than the wall.

The frog is also secreted by the villi of the sensitive frog, (yet to be explained), in the same way that the sole is secreted by the villi of the sensitive sole. The fibers of the frog pass in an oblique direction corresponding with the direction of the fibers of the wall at the quarters. It is not so dense as the wall, and consequently possesses much greater elasticity. Its fibers are much finer, and the hollow of the tubes comparatively much greater.

These tubes are not empty, but, like the inside of the hairs, are filled with a secretion of gelatinous (jelly-like) matter, like a pith. This renders the horny substance tough and elastic, and imparts to it that property which distinguishes it as living horn. If a piece of hoof is cut across, these piths can be seen, like little white spots.

Disease may interrupt the development of the hoof, or some forms of disease increase it. Heat and dryness render it hard and brittle. Moisture softens it and renders it more elastic, but, at the same time, renders it weaker and less resisting.

The horny lamellæ are generally said to be secreted from the sensitive lamellæ; but of the correctness of this I entertain some doubt. They appear to me to be a secretion from the lower edge of the outer part of the membrane lining the side of the coronary substance, which lies in contact with the excavation in the upper border of the wall. I have never demonstrated this, but think I have seen their origin in this, in the

hoofs of colts. They have no connection with the sensitive lamellæ except contact.

THE INTERNAL FOOT.

As before stated, the principal internal parts of the foot are the coffin-bone, the navicular bone, the lateral cartilages, the coronary substance, or ligament, the sensitive lamellæ, the sensitive sole, the sensitive frog, and certain ligaments. Each of these I shall now proceed to explain.

The coffin-bone occupies the principal part of the cavity of the foot. It is the base, or foundation, of the bony structure. It is the shape of a half-moon, (semilunar). It is divided, for description, into the wall, sole, tendonous surface, articulating surface, and wings. Throughout, it corresponds with the shape of the foot quite well. The wall corresponds with the wall of the foot, having the same degree of shape, and becoming shallower back toward the quarters. Its surface is quite rough for the attachment of the fibrous membrane to which the sensitive lamellæ are attached. It is also pierced by many little holes, for blood-vessels and nerves to pass through. The upper border of the wall rises into quite a prominence, called the coronal process, which forms the upper and forward part of the coffin-joint, and to which the extensor tendon is attached. The sole of the coffin-bone is concave, or hollowed, and corresponds with the convexity, or ovalness, of the upper surface of the sole, from which it is separated by the sensitive sole. The back and middle part of the sole is sloped out into a semicircular (half-circle) excavation, more than half as broad as the sole, called the tendonous surface, for the attachment of a very broad, strong tendon, called the flexor tendon, (*flexor pedis perforans*), and whose office it is to turn the foot back, as a man shuts his hand.

The wings of the coffin-bone are backward projections terminating in the heels. They are much grooved, and perforated with many holes for blood-vessels and nerves, making them

very rough. The upper border is marked by a deep groove running back to the heel. From each of these grooves arises a broad plate of cartilage, called the lateral (side) cartilages. These are rounded on their outside, but irregularly hollowed, or concave, on their inside. They fill up the back corners of the heel of the inside of the foot. Their upper part may be felt under the skin of the heel, and their outline is even perceptible to the eye. Their lower half is covered with the lamellæ, the same as the coffin-bone, and, of course, by the wall of the hoof. The superior (upper) portion of the coffin-bone is occupied with the articulatory surface which inclines backward. It presents a broad, more than half-moon, smooth face, hollowed out, or concave, from before backward, the middle being raised into a ridge, and the outer boundaries also being raised slightly at each side, but very prominently above, where it is bounded by the coronary process. This face forms about three-fourths of the lower articulating surface of the coffin-joint. At the back of the bone, looking almost straight back, and extending from the inside of one wing to the other, and very narrow, is another smooth articulating surface, which articulates with the upper half of the front border of the shuttle-bone.

The navicular, or shuttle-bone, bears some resemblance to a weaver's shuttle. It is more rounded on its forward border than on the hinder one. By its forward border, the upper half of it, as we have just above stated, articulates with the coffin-bone. Its upper surface forms the posterior (hinder) third of the lower articulating surface of the coffin-joint, being similarly raised in the middle, and depressed toward the ends of this bone, which terminates within the wings of the coffin-bone. The posterior border is slightly beveled, and rough, for the attachment of an important broad tendon, which, a little above, unites with the great flexor tendon. Its under surface is smooth and rounded, and marked by a ridge running across it. It rests on the flexor tendon, which passes under it to be attached to the coffin-bone. There is a

strong ligament attached along the lower half of the forward border, and to the coffin-bone in front of it. Two ligaments, one attached at each end of the shuttle-bone, pass up and are attached to the sides of the coronal, or lower pastern-bone.

The Coronary Substance.—I shall now proceed to the explanation of this important and extraordinary structure. It is generally called the coronary ligament, but very inappropriately, as it has none of the characteristics of those parts which are called ligaments.

The situation of the coronary substance, as has been before pointed out, is in the hollowed out or shaved out upper border of the wall of the hoof, lying directly behind the coronary ring. It is the main cause of the prominence around the upper border of the crust, called the coronet. It is broadest and thickest around the front part of the wall, becoming narrower and thinner around the quarters and heels, and posteriorly being joined to and lost in the substance of the heels of the sensitive frog.

The connection with the wall is formed by the little tubes called villi, which secrete the horn. Its inner side, in front, is connected with the coffin-bone and the extensor tendon; at the sides with the cartilages which rise up from the sides and wings of the coffin-bone. It is united to these by what is called cellular tissue. The superior, or upper, border of the coronary substance appears to be a continuation of the true skin. But this is not the case. The anatomist finds a plain line of separation between them, and its structure demonstrates or proves its different character. Its lower border, as it passes down on the coffin-bone, becomes thin and gathered into numerous little points, from which are formed the sensitive lamellæ.

Three different parts are found in the coronary substance. A cartilaginous net-work, which is the base or frame-work of the structure, and the office of which seems to be to accommodate it to the motions of the parts, and to afford protection to the glandular structure. The next part is a net-work of

blood-vessels, which constitute the bulk of this substance, and which are supported by the cartilaginous part, and covered by the third part of the structure, which is the cuticular (resembling cuticle, or skin,) covering.

This coronary substance is more abundantly supplied with blood-vessels than any other part of the body. The greatest care seems to have been taken to protect it, so that it might be uninterruptedly supplied with blood, from which the wall is secreted.

THE SENSITIVE LAMELLÆ

Is derived from, or is a continuation of, the coronary substance; it descends from its lower border on the coffin-bone and its appendages, the lateral cartilages, to the groove formed by the union of the wall of the hoof and sole. But as this surface is much less in circumference than the length of the coronary substance, this membrane is gathered into hundreds of little plaits, or folds, running from the coronary substance, where it originates, to its lower border near the groove before spoken of, and where it unites with the sensitive sole. These little plaits, or folds, are the *sensitive lamellæ*. Each lamella is, therefore, composed of a plait of this membrane; that is, of two thicknesses of it. The breadth of the lamella is one-tenth of an inch, and about as thick as common paper. The length varies with the situation, being longest where they pass down the coffin-bone, and getting shorter toward the posterior, or back, part. The sensitive lamellæ are received into the spaces between the horny lamellæ, which line the inside of the wall of the hoof, as before described. The number of sensitive lamellæ have been estimated at from five to six hundred.

They are highly organized, though not so well supplied with blood-vessels as the sensitive sole, or sensitive frog. They are supplied with blood for their own nutrition.

They have been represented by some writers as possessing a wonderful degree of elasticity. But this is erroneous, though

it is certain they possess this property to some extent. The sensitive and horny lamellæ, by their peculiar union, give prodigious strength to the connection of the coffin-bone with the wall of the hoof. The coffin-bone, which bears almost the entire weight of the animal, is suspended, or hung up, by the lamellæ to the wall of the hoof. It is comparatively little of the weight that rests on the sole and frog. If any one doubts the capability of the lamellæ to bear such weight by their union, let him take a pamphlet of one hundred pages, and let the leaves of this be put between the leaves of a stiff-backed book, only one-fourth of an inch, so that the margin of each leaf in the one book will lie between the margin of those of the other; then press the stiff backed book firmly together, and let another person grasp the small book and test the force necessary to draw them apart. And yet this is but a feeble illustration of the strength of the union of the lamellæ. How different from common opinion is this arrangement for supporting the weight of the horse! And yet how wise it is! For if the immense weight of the horse, in jumping a fence for example, were thrown on the comparatively small base described by the circumference of the hoof, it must soon be crushed. But by the weight being suspended by the lamellæ, their aggregate surfaces will represent the base on which the weight of the animal rests, and, as we have before seen, the surface of the horny lamellæ of one foot amounts to one and a half square feet; by doubling this we get the surface of all the lamellæ of one foot, which we find is three square feet. This, multiplied by four, gives an aggregate of twelve square feet as the surface of all the lamellæ. Hence we see that the horse's weight actually rests on a base equal to twelve square feet; but the elasticity of the parts is their chief protection. .

Elastic Structure.—This is a layer of fibrous (composed of fibers) structure, resembling the proper covering (periosteum) of the bone, lining the upper side of the coffin-bone, and constituting the connection between it and the sensitive lamellæ.

It is quite thick, and furnishes a bed for the numerous blood-vessels entering and coming from the coffin-bone. The sensitive lamellæ are attached to it. It is an exceedingly elastic substance, so much so, indeed, that it will stretch out and draw back like India-rubber. In this resides the elasticity which has been attributed to the lamellæ. How much wiser is this arrangement than to have the lamellæ themselves endowed with this high degree of elasticity, by which their union would necessarily be endangered!

THE SENSITIVE SOLE.

This is a tough, fibrous, and extremely vascular (full of blood) membrane, firmly attached to the under side of the coffin-bone, and corresponding in shape with the horny sole, and lying on its upper, or convex, surface.

It is chiefly composed of the same sort of fibrous, tough, whitish, elastic (springy) substance which covers the upper, or rounded, side of the coffin-bone, and to which the sensitive lamellæ are attached. It is more compact and finer than the covering of the upper side of the coffin-bone. It forms the bed for a beautiful net-work of veins, which furnish the blood from which is secreted or formed the horny sole. Both the fibrous and vascular parts are covered by a thin membrane, from which pass many little tubes, or villi, entering the pores, or little holes, on the upper side of the horny sole, and from which it is secreted or formed, as has been before explained.

The sensitive sole, sometimes called the *fleshy sole*, is united around the lower border of the coffin-bone with the elastic structure covering the bone. Behind, along the border of the V-shaped cleft, it is united with the sensitive, or fleshy, frog. Its thickness is, on an average, about the eighth of an inch, though it varies in different parts, being the thickest toward the heels.

Its office, in part, is to prevent concussion, but chiefly to furnish blood from which the horny sole is secreted, and to

protect blood-vessels passing out of the coffin-bone and through the sensitive sole. It is well supplied with nerves, and is very sensitive, quite susceptible to injury or inflammation. Corns are produced by a bruise and inflammation of the sensitive sole between the crust and the bars.

What a wise provision of nature the springy suspension of the horse is! In addition to other advantages, it gives free circulation to the blood in the sensitive sole, etc., which would be impeded if the coffin-bone rested on the sensitive sole.

THE SENSITIVE FROG.

This is a thick, irregular-shaped body, occupying the space bounded above by the great flexor tendon and the skin of the heel, below by the horny frog, and to the sides by the cartilages which rise up from the sides and heels of the coffin-bone. It is firmly attached to all the parts; and the coronary substance and sensitive sole are also attached to it, or rather are lost in it. Its posterior parts, or heels, are covered with its own skin-like investment. Its under surface is marked by grooves, corresponding with the eminences of the upper surface of the horny frog, and fleshy projections corresponding with the grooves of the horny frog. Its structure is somewhat similar to that of the sensitive sole, being composed of an elastic, slightly fibrous structure, a fibrous cartilaginous part, a net-work of blood-vessels, and an external skin-like covering.

The main body of the sensitive frog is made up of a yellowish white substance, of a spongy, slightly fibrous and elastic character, and which has been mistaken for a fatty pulp, and called the "fatty frog."

The fibrous, cartilaginous part covers those parts of the elastic substance, just described, on which there is greatest pressure, being, in some places, as much as one-fourth of an inch thick. It also sends branches through the elastic substance in various and irregular directions. It appears to be a frame-work to support the other structures of the sensitive

frog, and furnishes a bed for the next part of this body, which is,

The Net-work of Blood-vessels.—These are chiefly veins, and furnish the blood to supply the sensitive frog with nutriment, and from which is secreted the horny sole, by means of the villi which project from under the surface of *the skin-like covering* of the sensitive frog. This is continuous from above with the skin, and covers the heels and cleft behind, passes under, lining the under surface of the sensitive frog, and above, being continuous with the cuticular (skin-like) covering of the coronary substance.

THE AGE.

To be able to determine the age of a horse within a few months, during the period of his greatest usefulness, is an object of considerable interest to every person who may ever wish to purchase one of these noble animals. And to those who are engaged in the frequent buying and selling of horses, it is absolutely indispensable to be expert in this art. Many a man has been the victim of a roguish dealer, or jockey, and had a “*doctored*” old horse, almost worthless, put on him for a splendid five or seven-year old; and thus he has been swindled out of his money, and laughed at by his neighbors, only for his ignorance of a few simple points to be observed to enable any man of common sense to tell the age of a horse with approximate certainty.

In treating of this subject I shall describe the successive changes the mouth undergoes up to that age at which the changes become obscure and uncertain, which, very fortunately, is beyond the period of his highest value and usefulness, and beyond which a prudent man will very seldom purchase a horse at any price.

At the time it is foaled the colt will be found to have four teeth in each jaw, two on either side, making eight in all; these are the first and second grinders.



At from seven to nine days old, two nippers in each jaw will be found to have made their appearance. They are usually not entirely visible until the ninth day. They fill the mouth from side to side, apparently, though they will be found to be small when compared with the permanent teeth. By the time he is one month old, he will be found to have the third pair of grinders in each jaw, making in all twelve grinders.

When he is six weeks old he gets another, or second, pair of nippers in each jaw, making four nippers in each jaw, or eight in all. At this time the middle nippers will be about two-thirds grown, and at the end of two months will have reached their full length, and in a month more, that is, when the colt is three months old, the second pair will have reached the height of the first. They then show a sharp edge to the outside, but commencing to wear, they will have come to a level about the ninth month of the colt's age.



At this time, the ninth month, another pair of nippers start up in each jaw, outside of the second pair. The mouth will then present twelve nippers, or incisors, six above and six below. This is called *the colt's mouth*. No further change, except in the wear of these teeth, is observed until the colt is between two and three years old; and some of these temporary teeth remain until he reaches the age

of five years.

Before proceeding further in the description of the changes which the teeth undergo, I shall give a brief description of the structure of the teeth. The germs, or seeds, of all the teeth, both of the milk-teeth and the permanent set, may be found

deposited in cavities in the jaw of the embryo, the germs of the former lying above those of the latter. These germs are well supplied with vessels for their nutriment by means of a delicate membranous envelope. The growth of the milk-teeth is much more rapid in their earlier development than that of the permanent teeth. The tooth is a mere pulp until it has attained considerable size. It then begins to have deposited the proper bony substance of the body of the tooth, and its hard covering for that part which is afterward to be exposed above the gums. This is called the enamel of the tooth, and is so hard as to resist iron, and even a file with difficulty will make an impression on it. The enamel is deposited with remarkable adaptation to the objects for which it is intended, being quite heavy over those parts of the tooth to which the food is exposed in nipping and grinding, but comparatively thin over the remainder of the tooth above the gum, and extending in a thin scale but a little way beneath it. It is also arranged so as to greatly strengthen the tooth. But, notwithstanding all this, the teeth of the horse must wear away.

The enamel, as it passes over the nipper, or incisor tooth, dips down into the bony substance, leaving an oval depression in the crown of the tooth, called the mark, and rises to rather a sharp edge on the front margin of the tooth. The mark, as it is called, is occasioned by the food blackening the bottom of the depression before described, as formed by the dipping of the enamel as it passes over the crown of the tooth. Some persons have an idea that the mark is formed by a circle of the enamel being sunk in the middle of the tooth, with a hole in the center, and talk of the filling up of the tooth. But this is a very erroneous idea. The depression does not fill up, but the wearing down of the enamel by use gradually changes the shape and appearance of the mark, and eventually entirely obliterates it, or rubs it out.

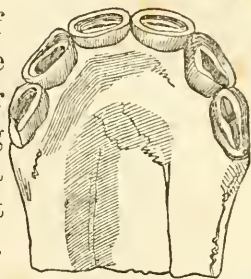
The structure of the grinder is quite different from that of the nipper, or incisor. Instead of one sack, or bag, of pulp

ossifying within and enamel forming without by crystallization, we have the same process going on within the cavity of the jaw, in five sacks for an upper grinder and four for a lower, as if the intention were to form these respective numbers of teeth. The enamel can be traced around each of these divisions, and they would undoubtedly be distinct, but another substance is now secreted, which, being a powerful cement, unites all into one body, making one tooth. After this, another coat of enamel spreads over the sides, but not over the top, and the tooth is complete. By this disposition of columns of bone, cement, and enamel, a most prodigious degree of strength is obtained, and the grinder is capable of crushing the solid substances constituting the food of the horse. But as the bone and cement wear away faster than the enamel, a rough surface is always presented, thus enabling the horse to grind oats and corn, for many years, without ever once having to "pick the millstones." The grinders in the lower jaw, being originally formed from only four bones, are not so large nor so rough as those in the upper jaw.

The grinders are not placed horizontally in either jaw. In the lower the higher side is within, and gradually shelving outward, while in the upper jaw the higher side is without, shelving inward, thus enabling the grinding motion to be performed with the greatest possible facility. Though, to the casual observer, a pile of horses' teeth would appear to have but little regularity about them, an experienced hand would readily assign each its proper situation. To the naturalist the study of the teeth of animals is a subject of greatest interest. But as the object of the present work is not to enter into the discussion of the beauties of science, but to furnish such information as will enable every person to give the horse that intelligent attention his worth and nobility deserve, and to detect the tricks and impositions of dishonest dealers, I shall return to the consideration of the changes which take place in the mouth. Observations are made on the teeth of the lower jaw

until after eight years of age. The following is the appearance of the mouth at one year old.

The four middle teeth have become level with each other previous to this time, and the third pair, or corner ones, are approaching the level of the others. They present, respectively, the following appearance: in the front pair, or two middle teeth, the mark is worn, being somewhat dim, but broad and regular, with a ring of enamel of very regular width, but thicker in front than behind, surrounding it.



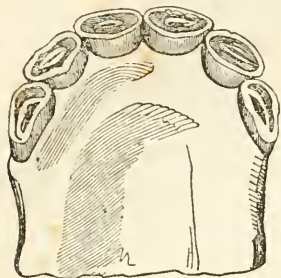
The mark is partly worn out of the next two, or second pair, but it is darker, longer, and narrower than in the first, and the ring of enamel surrounding it is not so regular. In the corner teeth the mark is of full depth, darker, longer, and narrower than in either of the others, the ring of enamel being heavier and more irregular. At this time another pair of grinders in each jaw make their appearance, making four in each jaw, on each side, or sixteen in all.

At this age, and for some time after, as indeed previous to this, the outer, or front, edge of the nippers is short, and the flat crown shelving or slanting backward to the inner side, so that the outer edges come together, while the inner edges do not meet. This is evidently intended to facilitate the cutting process for the young animal, who is generally required to obtain his food from pasture, and not from the rack or manger. And we here have another exemplification of that admirable adaptation of means to ends, so frequently met with in the investigation of nature.

Soon the sharp edge commences to wear down, but the colt is growing stronger, and able to use more blunt teeth. As they wear down, the mark, which was at first narrow and as long as the size of the tooth would allow, becomes short, wide, and shallow, and at the age of eighteen months the mark in the front pair will have become much shorter and more indis-

tinct, and in the others will have undergone an evident change, and the nippers will meet on their flat crowns.

At the age of two years the middle pair are quite smooth, and the next pair present very nearly the same marks the first did at one year old, and the corner ones have a faint mark. About this time, also, a fifth pair of grinders in each jaw will come out.



About this time another change is preparing to take place. The jaw or maxillary bones are increasing, and though the milk-teeth, at the completion of the colt's mouth, were sufficiently large to fill it, and as strong as necessary for preparing any food suitable for the young animal, they will soon be found neither broad enough to fill the jaw, showing spaces between them, nor strong enough for the mastication of the coarser and harder food which the animal requires. Nature has made provision for these necessities, and has provided for a new set of teeth, larger and more substantial than the first, as we have before seen in the germ, from which they are developed, being placed in the cavities in the jaw beneath those from which the temporary teeth were developed while the animal was yet unborn.

It is of some importance to understand the process by which the temporary teeth are replaced by the permanent set. It is a well-known principle that if a constant pressure, however light, be kept up on any organized substance, it will be found to waste away at the point where the pressure is applied, or, as it is called, will be absorbed. The same little vessels which run through every organized substance to carry off the worn-out particles, and which are called absorbents, in this case carry off, also, the particles against which the pressure is made. I will illustrate this by a few facts. A wen on the head, though a very light thing, remaining for years, will cause a portion of the solid bone under it to be absorbed. And if the skull is examined after death, a little pit, or depression, will be

found under the wen. The pressure of the garter causes an absorption of the muscles under it and of the shin-bone, making a little notch in it.

Now, as we have seen that the germ of the permanent tooth lies immediately under the root of the temporary tooth, when this germ begins to grow it will commence pressing on the root of the temporary tooth, and a gradual absorption of the root takes place. This pressure being continued by the new tooth still growing, the root will eventually be entirely absorbed below the surface of the gum, and the old tooth will fall off, having nothing left to hold it, or, perhaps, being loosened from the gum at one side, will be held by a small bit of skin at the other, and, peeping up in its place, will be found the new tooth.

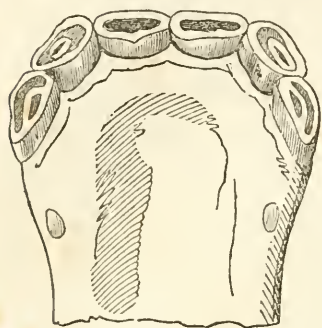
Hence, we see that the old tooth is not "pushed up, or punched or crowded out," as many suppose, but is merely replaced by the new one.

Occasionally, however, nature does not do her work just exactly according to rule, and the new tooth does not come up immediately under the old one, but comes up by the side of the root of the milk-tooth, and thus the pressure is made along the whole length of the tooth-crown as well as fang, which crowds it out to the fore-part of the first grinder, where it will remain for some time under the name of wolf's-tooth, causing soreness and tenderness of the gums, and not unfrequently wounding the cheek. This would probably be quite absorbed, but not for some time. Hence, it is proper to remove it as soon as it is discovered, for the horse can not eat without some inconvenience while it remains.

I shall now proceed to explain the order of the shedding, or casting, of the temporary, milk, colt, or deciduous teeth, and the appearances of the permanent set; and this takes place much in the same order as the appearance of the first teeth.

At the age of two years the first grinders give place to large, permanent ones. In the spring, before the colt arrives at three

years of age, he will shed the front pair of nippers in each jaw. Some early colts change sooner than this; but those foaled in May or June commence showing signs of casting the



middle teeth in the spring. The gum will have the appearance of receding, and very soon the fang of the old tooth will be quite absorbed, and the young tooth will appear in its place as if it had pushed the old one out. *This is called the three-year-old mouth.* The upper pair of front nippers are usually cast first, and then the lower. While these

new teeth are growing, the colt may have some difficulty in obtaining sufficient food by grazing, and if so, should be fed on bran or other soft food. The colt should be well fed while shedding his teeth.

The accompanying cut represents the three-year-old mouth. The two middle nippers are not grown to their full length. They are slow in their growth, and it is well they should be, for otherwise they would stick up above the others, and the colt could not nip with all together. When full-grown they are longer than the temporary teeth, and also wider, which might seem impossible, as they are destined to occupy the same position; but the colt's teeth are constantly diminishing in size by wearing off at the top, and becoming narrower, as they are smaller toward the root than at the top; the jaw is also growing, which makes the spaces between the teeth wider, and thus room is afforded for the larger permanent teeth.

The first incisors are somewhat round on the outside, and a little hollowing on the inside; their surface is also smooth. The new ones have two grooves on the front side, extending from the edge downward. The new ones have a mark, the same as their predecessors. It is long, narrow, deep, and black. In the three-year-old mouth the mark in the second pair of nippers is almost, if not entirely, obliterated, and fast wearing

from the corner ones. By an examination of these, not only the age may be determined, but the villainous fraud detected, sometimes practiced by dealers, of selling an early two-year-old for a three-year old. This is done in the following way: Some colts come three or four months earlier than others, and, consequently, their second teeth commence to grow sooner. The rogue punches out the two front teeth, and thus removes the pressure of the roots on the new ones, and, consequently, they grow faster. After they appear, the jockey represents the colt as being a late comer, one of the year previous to his birth, and is thus enabled to sell him at an advanced price; but this fraud can easily be detected by attention to the description I have given of the mouth at this age. It must be carefully remembered that the mark will be too visible in the other teeth. Also the upper jaw should be examined, for the rogue generally confines his operations to the lower one, seldom interfering with the upper one. The two-year-old mouth will generally be found here, though nine times out of ten the upper ones are first to change. Next year—that is, previous to the colt becoming four years old—about the same time of the year, the second pair of nippers will be shed. At this time the mouth can not be mistaken. The central nippers will have attained nearly their full growth, and a space will be left where the second pair stood, and, perhaps, the new ones making their appearance. The corner ones will be diminished in breadth and worn down, the mark being worn nearly out. At this period the second pair of grinders will be shed. Previous to this, also, an attempt will be made to give the three-year-old an appearance of a four, by a similar process to that before described.

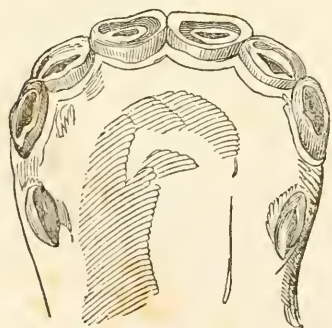
Our cut represents *the four-year-old mouth*. The center nippers are fully grown; the front edges, which were sharp, are somewhat blunted; the mark in them is becoming short, wide, and narrow. The next pair are now full grown, but smaller than the middle or corner ones. The corner ones will be

evidently smaller than when first matured, and having the mark almost worn out. As with the others, a change next takes place in the corner nippers. At four and a half, or between that and five, they begin to strip, and are soon replaced by their successors.



At this time, also, the animal starts his tushes. They come up between the nippers and grinders, rather nearer the former than the latter, but the distance increases as the jaw grows, which continues until seven.

At five, the mouth being full, the nippers all set, the four tushes from three to five months old, the colt becomes a horse, and, at the same age, the filly, a mare, her mouth passing through the same changes, except as regards the tushes, which, in many cases, do not appear at all, but in others appear only as small and rudimentary.



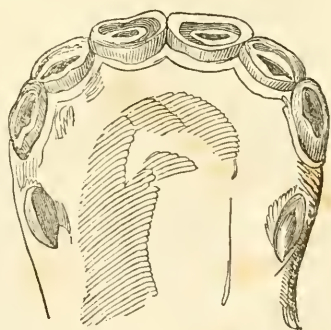
The cut shows *the five-year-old mouth*. The tush is round and sharp, and, at first, having a groove on each side, and hollow within, like a hog's tush. The corner nippers are full grown, the mark long, deep, and narrow, and irregular on the inside. The tush is still sharp, but the groove on the outside worn out, or nearly so, and the outside convex, or

round. The sixth pair of molars are up at this time, and the third is wanting. These appearances must be carefully observed to prevent deception, by the attempt to put off a four for a five-year old. The only teeth which remain permanent, or are never shed, are the last three pairs of grinders and the tushes. All the others, as we have seen, are cast, and replaced at most remarkably regular intervals of time, and in such a

way as to occasion the animal but comparatively little inconvenience, as well as furnishing a very accurate record of his age, which can easily be read by a little experience.

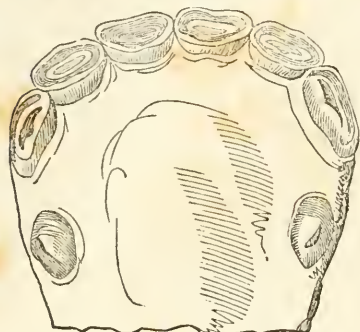
After five the indications of age begin to become more obscure, the only way of determining it being by the wearing down of the nippers causing the gradual change and final wearing out of the mark. Sometimes, however, a horse has what is called a shell-tooth; but this is seldom the case. To an inexperienced observer such a horse presents a seven-year-old mouth for life, but to a judge, however, this presents no mystery. These shell-teeth fill the mouth, in front, level with the others, and are of the natural shape on the outside, but on the inside they are of the form of a sea-shell. Consequently, the mark in them never wears out; but, by attention to the following description of the ordinary mouth, these need occasion no difficulty.

Our next cut represents the *six-year-old* mouth with the mark entirely gone in the front pair of nippers. There still remains, however, a slight depression of the cement filling the center, and this is, of course, surrounded by enamel. This depression is of a dark or brown color, from the stain imparted to it



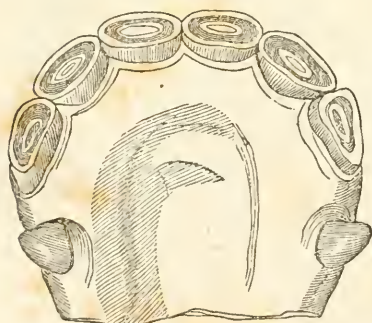
by the herbs on which the animal feeds. Outside of this ring of enamel the bony substance also is worn below the level of the enamel, and also presents a stained or brown appearance. Their cutting edge is quite smooth. The second pair are approaching the appearance of the first, the mark becoming short, broad, and faint. The corner ones show evident signs of wear. The tusches have reached their full growth, and are from three-fourths to an inch in length, rounded to the outside and hollow to the inside, and tending to be hooked toward the point. The third pair of grinders are of their full length, and

all the grinders are level. At this period, or perhaps six months previous, the horse may be said to have a perfect mouth, all the changes in the teeth, except those produced by wear, having been completed. Hitherto, we have been judging of the horse's age by the combined indications of the growth and wear. Hereafter we shall have nothing to direct us but those of wear.



at the point, still rounded outside and at the edges, and becoming so on the inside.

At seven, as the annexed cut represents, the mark has entirely disappeared from the four inner teeth, and very nearly from the corner ones; the second pair showing about the appearance the front pair did at six, while the latter will be much more worn. The tushes begin to show marks of wear, being rounded



The next cut shows the *eight-year-old* mouth, with the mark gone from all the nippers below, which, indeed, is generally the case some time previous to the horse filling his eighth year. The tushes are now rounded in every way. As soon as age commences to reduce the horse, the knave sometimes

tries to give the mouth a counterfeit appearance to enhance his value, his object being to keep the horse of the appearance of seven years old, though he may be ten, or more. This is called "*Bishoping*," the name being derived from the rascal who invented the trick. To accomplish it, the horse is thrown, and a hole is punched in the two corner teeth, resembling the depressions in the seven-year-old's teeth. This is then burned with a hot iron, which imparts a dark stain. The

second pair are also slightly stamped, and touched with the iron. This fraud is easily detected by the appearance of the teeth in the upper jaw, which the buyer should examine, even in the absence of the suspicion of "Bishoping." The upper nippers retain the mark three or four years longer than the lower. The reason of this is, because the upper jaw is fixed or stationary, and the food is only pressed against it, while, by the lateral grinding motion of the lower jaw, its teeth rub on the food, causing them to be more rapidly worn away. As the upper nippers furnish the only reliable indication of the age from eight up to eleven or twelve, I shall now give their appearances, until the mark in them is entirely obliterated, or worn out.

At nine the mark will be worn out of the middle pair of upper incisors, and they will have the appearance of the lower ones as described at six. At ten the second pair of upper nippers will have the mark worn out of them, presenting the appearance of the lower jaw at seven. At eleven, the upper corner cutters will have the mark worn out, and the upper jaw will correspond to the appearance of the lower at eight.

There are, however, some variations from the order of the wearing out of the mark in the upper nippers. In some cases the mark will be out of the corner ones at ten, generally at ten and a half, and if not, it may remain until twelve. Some rely considerably on the tushes, but they are no criterion to go by, for while they do afford any indications at all, there are much better to be found in the nippers. The back teeth, or grinders, may indeed be referred to, and with considerable accuracy, but they are too far from view, and so difficult to expose as to render their examination almost impracticable.

After the disappearance of the marks, the best, and almost the only means of information as to the horse's age, are the indications presented by the wear and tear, and these can only

furnish approximate certainty—perhaps enable one to judge within a year or two, in all ordinary cases. In the first place, it will be necessary to consider the first or original form of the nippers. It will be remembered that when the mouth is perfect, the nippers present on their edges, or cutting surface, an oval shape, the length of the oval running across from tooth to tooth. At eight this appearance is very marked. The teeth being wider at the top than lower down toward the roots, as has been before remarked, they must necessarily become narrower on their cutting edges as they are worn down. At first they measure widest from side to side, but as they wear down, they become nearer round, until finally they become broadest from inward to outward. At the same time, also, the oval appearance of the top is becoming shorter and shorter until it becomes round, and at last gets to run from out inward. Another indication of some importance is the form of the flesh, or gum, around and between the teeth at their roots, and to which I shall refer in connection with the wear of the teeth.

Soon after eight the cutters will begin to change their shape from oval, becoming round. At nine the front pair will have become perceptibly more round, and a little apart. At ten the others begin to have the oval shortened. At eleven the second ones will have become quite round, with the spaces between them and the first opening; and at thirteen the corner ones will have become of this shape. From fourteen to fifteen the face of the middle nippers look triangular. At seventeen all of them will have the triangular appearance. At nineteen the triangular corners begin to wear off, and the oval changes in the front nippers from running laterally to outward and inward; and, the last change that can be traced, they all wear this appearance at twenty-one.

A strong presumption of the horse's age may be drawn from the appearance of the roots of the teeth. It will be remembered that the enamel extends but a little below the gum.

After the teeth have worn down a considerable distance, if the flesh kept its place, they could hardly be seen at fifteen. But the fact is, they keep their length, or very nearly so. This is effected by the growth of the bony part of the tooth, the enamel never being repaired, and by the flesh or gum stripping off the root, which was once covered. This portion becomes covered with tartar, which gives the yellow appearance of the teeth of old horses.

At about ten the inner gums and bars of the palate commence to shrink, and, as this becomes greater, indicates advancing age.

There are some indications of age, of a general character, which deserve notice—among which may be mentioned the general expression of the horse; the deepening of the hollows above the eyes; the appearance of white hairs, particularly about the eyes and muzzle; shrinking and hanging down of the lips; sharpening of the withers; swagging down of the back; lengthening of the quarters; sharpening of the border of the lower jaw, and the disappearance or absorption of all tumors, spavins, wind-galls, etc.

The means of ascertaining the allotted period of the horse's age are very unsatisfactory. So many circumstances attend the domesticated animal, tending to the more or less rapid destruction of his system, that it is very difficult, if not impossible, to ascertain what would be the "number of the days of his years," were the laws of his being never violated. A few cases of great age are on record. Blaine tells of a gentleman who had three horses which died at the ages, respectively, of thirty-five, thirty-seven, and thirty-nine. Percival gives an account of a barge-horse that attained the great age of sixty-two years. Cully also tells of a horse which received a ball in his neck at the battle of Preston, in 1715, and which was extracted at his death in 1758. Many stallions in the United States have attained a very advanced age. The Morgan horses live to a good old age generally. The original, or Jus-

tin Morgan, died from the effects of a kick at the age of — years, and was, at the time he was hurt, in almost full possession of his great strength. Upon the whole, I think that twenty-one might be regarded as the horse's natural age. Perhaps as great a per cent. of horses live beyond that age, as of the human family live over "threescore and ten." Zoologists give us the rule that the natural life of an animal is five times the time it takes it to attain its full growth. According to this rule, the natural age of the horse would be about twenty-five years.

DIVISION IV.

MEDICINES, INSTRUMENTS, AND APPARATUSES.

MEDICINES.

IN this part of the work I shall describe all the medicines used in the treatment of the diseases of the horse. I shall explain, as clearly as possible, their appearance, manner of preparation, effect when given, the size of the dose, and the way it is to be given. This part of the work will be found so complete that in it may be found from three to a dozen reliable medicines for nearly every disease to which the horse is liable. Many of these are articles always on hand in the farmer's house, or easily obtained, so that if a horse is taken suddenly sick, a safe medicine may be selected and given, without subjecting the horse to the torture of the many ignorant fellows who are always ready to throw dose after dose into his stomach without being able to tell what effect they expect their medicines will have, and who can not even tell when the dose they have given is having a good or bad effect. I have known dose after dose of articles given a sick horse, when the very first one given would have been sufficient to have injured or killed the animal.

Medicines are classed according to the effect they produce when given. I shall explain the effect of the principal classes, namely:

Cathartics.—These are such articles of medicine as act on the bowels in such a way as to cause several or frequent operations, which generally take place in from three to twelve hours

after the medicine is given. Some produce very watery operations; others seem only to increase the number without much altering the appearance; others cause a much greater quantity of bile in the operations. Cathartics are sometimes called *physics*. They do a great deal of harm when improperly given; but when properly given, they are very valuable in many diseases. The principal medicines used as cathartics, or physics, in the treatment of the diseases of the horse, are, aloes, salts, croton oil, podophyllin, linseed-oil, etc.

Laxatives are medicines which act but slightly on the bowels. Cathartics in small doses generally, but not always, act as laxatives.

Diuretics are articles which increase the quantity of urine or water. They are very useful agents, but if too long given may do much mischief. They are very valuable in fevers and inflammations. Among the diuretics most frequently given are niter, sweet spirits of niter, turpentine, cream of tartar, and digitalis. When giving diuretics, the patient should be kept cool, and allowed to drink freely.

Diaphoretics are medicines which cause sweating, or increase the insensible perspiration from the skin. Those articles which act as diaphoretics on the horse are not very numerous. Antimony and sulphur are most frequently employed. But warm clothing and good rubbing are the most effectual where the object is to produce condition. To cause prompt and free sweating, the most powerful means is the "whisky sweat," or steaming. They are the most useful in inflammations.

Astringents are medicines which lessen or stop discharges, either natural or unnatural, as the discharges from the bowels, nose, kidneys, or from bleeding vessels, wounds, etc. They act by "puckering up" the parts from which the discharge takes place. Some astringents are to be given internally; some are to be applied to the part from which the discharge occurs. Alum, sugar of lead, tannin, opium, persulphate of iron, kino, and catechu are valuable astringents.

Nauseants—medicines which cause sickness at the stomach. Medicines which vomit the human patient are only nauseants to the horse. There are many of them, as tartar emetic, lobelia, blood-root, sulphate of zinc, etc. They are frequently used in the treatment of the diseases of the horse, and are very valuable remedies. They are substitutes for bleeding.

Stimulants—articles which increase the heat of the system, and increase the action of the heart and lungs. They have a hot or pungent taste. They are useful in many cases, both internally and rubbed on the outside. Capsicum, or Cayenne pepper, ginger, black pepper, camphor, whisky, and many other articles belong to this class.

Tonics are medicines which improve the tone or energies of the system. Most bitter plants, and iron, belong to this class. Their effect is to improve the blood.

Antispasmodics are medicines which act on the system in such a way as to relieve spasms. This name means opposed to spasms. They are useful in lock-jaw, colic, apoplexy, and several other diseases. Turpentine, chloroform, lobelia, asa-fœtida, gelseminum, and prickly-ash belong to this class.

Narcotics are medicines which benumb the sensibility of the system. They lessen the disposition to move, and produce sleep. In overdoses they produce death. Opium, tobacco, hemlock, and belladonna, or deadly nightshade, are narcotics.

Sedatives lessen the action and power of the muscles, nerves, and arteries. They are generally narcotics also. The sedatives most used are digitalis, niter, opium, and veratrum viride.

Carminatives are articles which expel or drive off wind, as caraway seeds, prickly-ash berries, compound spirits of lavender, black pepper, ginger, cloves, sage, peppermint, etc. They are useful in colic, and windy griping in any disease. If no other remedy is at hand, in colic any of these may be given freely.

Relaxants deprive the muscles of their power, so that they are not under the control of the will. Lobelia and gelseminum are of this class.

Expectorants loosen the mucus in the air-passages. They are very useful in dry coughs. Nauseants act as expectorants.

Refrigerants are cooling medicines. A cooling effect may be produced by a cathartic, diaphoretic, or diuretic. Refrigerants are useful in fevers and inflammation.

Alteratives are medicines which act generally and continually on the system, gradually improving the health by improving the blood and acting on the glands of the system. They are very valuable, but are often given when the natural reparative powers of the system would do better without them. They are useful in surfeit, mange, farcy, glanders, consumption, and many other unhealthy conditions of the system. Antimony, niter, sulphur, ginger, and mercury are used as alteratives.

Vermifuges—medicines that remove worms. Those used in veterinary practice are quite numerous, aloes, calomel, tartar emetic, wood-ashes, turpentine, etc., etc. (See "Treatment of Worms.")

Antiseptics—articles which stop putrefaction. Charcoal, yeast, sulphate of zinc, creosote, pyroligneous acid, etc.

Vesicants—articles that raise blisters or vesicles.

Caustics—agents which burn the skin or flesh to which they are applied, as caustic potash, lunar caustic, aqua fortis, and the actual cautery, or hot iron.

There are several other names which indicate the action of medicines, but the above list will be sufficient for our purpose. It must be remembered that nearly every medicine has several different properties. Hence, the same medicine may be good in quite a number of different diseases.

Some medicines are given to the horse in the form of a drench, which is poured into the back part of the mouth, so that the horse can not avoid swallowing it; others are formed into a ball, which is simply a big pill, and which is forced far back in the mouth by the hand, or an instrument used for the purpose, so that it has to be swallowed; others are given in

powder mixed with the feed of the horse. Many liquid medicines are also given in this way. Indeed, nearly all medicines may be given in some kind of feed, unless so disagreeable to the taste as to make the horse refuse the feed. Of course, when the horse is too sick to eat, the medicine must be given in some other way.

LIST OF MEDICINES.

Acetic Acid.—This is a very strong acid. It has great power of dissolving, or eating up, many substances. It will destroy the animal part of bone, leaving the solid part. It is used by some for the purpose of blistering. It acts very quick. The following is a good vesicating liquid to raise little blisters:

Take—Acetic acid.....4 ounces.

Water.....1 pint.

Powdered cantharides..... $\frac{1}{2}$ ounce.

Mix, and let it stand two weeks, shaking it daily, and then pour off the liquid and bottle for use.

A sponge or several folds of cloth may be wet with this, and bound to the part, or it may be frequently rubbed on as a liniment. Its use may be continued from day to day. Useful in callous or hardened swellings, spavin, ring-bone, and splint.

Alcohol is the intoxicating principle of all liquors. When separated from them it is a clear liquid, and in this country is formed of two standard strengths. The stronger article, called *rectified spirit*, has a specific gravity of 0.835. The weaker article is called *dilute alcohol*, or *proof spirit*, and has a specific gravity of 0.935; being about one-half water, etc. Alcohol is used very extensively in preparing medicines, as tinctures, extracts, etc. It has the power of extracting the virtues of most plants, and, hence, it is useful in making tinctures. It is added to infusions to preserve them from spoiling. It is used as an external application to stimulate the skin; also in lice to destroy them. Internally, it is a pure stimulant.

Alum.—This is a well-known medicine. It is a valuable astringent. Burned alum is a mild caustic, often applied to fungus, or proud-flesh. The dose of it, internally, is from two to four drams, or even an ounce. It is used in founder, and may be used in diarrhea, to check the frequency of the discharges.

Aloes.—There are several kinds of aloes kept by druggists, but the best for veterinary practice is the Barbadoes aloes, which is the only kind recommended in this book, and those using it should always call for it. Barbadoes aloes is a dark brown substance, resembling an extract, and is hard to pulverize. It is a hardened juice obtained from the leaves of a foreign plant. It is best to powder enough of Barbadoes aloes for a year's use in frosty weather, as it is very difficult to pulverize it in warm weather. The powdered aloes should be kept in well-stopped bottles.

Aloes is the principal article used as a cathartic, or physic, in the treatment of the horse. The dose is about eight drams, or one ounce in weight, which would be of the powdered drug about two or three rounding table-spoonfuls. It has been very common to give aloes in the form of a ball, or big pill, but it takes this a long time to dissolve. It is far better to give it in solution. The best method of giving it is to have the drug well powdered, then mix with the dose of aloes one table-spoonful of ginger, and mix it in a pint of boiling water, stirring it frequently until cool. To be given as a drench, or draught.

As it is a good plan to keep a safe and reliable physic constantly on hand, either of the two following preparations of aloes may be used for this purpose:

Take—Powdered aloes.....	15 ounces.
Powdered ginger.....	1 ounce.
Palm-oil.....	8 ounces.

Beat all thoroughly together to form a mass.

This may be kept in a wide-mouthed bottle or earthen pot, well covered for use. To be given in a ball the size of a walnut, which can be made when needed. Mix with flour.

Take—Powdered gum-arabic.....1 ounce.

Powdered aloes 2 ounces.

Put into a pint of boiling water, and stir frequently.

When cold, add to it two ounces of tincture of ginger to prevent it from griping, and to keep it from spoiling. To be put in a bottle, and kept corked for use. The dose of this is from six to eight ounces, or twelve to sixteen table-spoonfuls. To be given as a drench, or drink.

The following is very useful in wounds which do not heal properly. It is very healing, and also protects the wound from the air. To be applied as a liniment:

Take—Powdered aloes.....2 ounces.

Powdered myrrh..... $\frac{1}{4}$ ounce.

Diluted alcohol.....1 quart.

Mix thoroughly together in a bottle, cork well, and shake it every day for two weeks. Then let it settle.

The practice of giving physic in broken, or divided, doses is wrong. There is no advantage in it in any case, and it may produce inflammation of the bowels. When physic is necessary, give a full dose at once.

Ammonia.—There are several preparations of ammonia. The *carbonate of ammonia* is a stimulant, used after inflammation is reduced in lung-fever. The dose is sixty grains in a pint of water.

Aqua ammonia is used as an external stimulant. It enters into the formation of many liniments.

Asafœtida is a well-known gum of a strong, garlicky smell. It is given either in the gum or tincture. It is stimulant and antispasmodic, exerting an especial control over the nervous system. It is used by some in inflammation of the brain,

vertigo, pleurisy, catarrh, thick wind, bloody urine, indigestion, moon-blindness, lock-jaw, stringhalt, hysteria, dropsical swelling of the legs, and button farcy. Gum asafœtida is given in doses of from twenty grains to two drams. It is often used as a preventive, to prevent horses from taking disease, and particularly those of a contagious nature. For this purpose a portion is tied up in a rag and nailed in the water-bucket, trough, or fastened to the bridle-bit. If immemorial custom is evidence of truth, it must be effective for this purpose.

Arnica is used in the form of tincture. It exerts great control over inflammation. It is most used as an application to external bruises and wounds where the skin is not much broken. An ounce of the tincture to one or two pints of water forms a wash of sufficient strength. It should be applied to the bruised part so as to keep it constantly wet. A cloth wet in the solution may be bound to the part. It is the best known remedy for bruises, sprains, or any local inflammation.

Tincture of *arnica* is used internally in inflammatory diseases, to lessen the action of the heart and arteries, in doses of from one to four drams, repeated every four hours. If the larger dose is first given, the dose must be decreased afterward. It is to be given in a pint of water. It has been used with success in inflammation of the eyes. For this purpose it may be used in proportion of one ounce to a pint of water.

Arsenic.—This is a mineral seldom met with. The article found in our drug-stores and called arsenic, is only *arsenious acid*. It is a white powder, with a faint, sweetish taste. It is a powerful poison, chiefly affecting the stomach. It has been used as a tonic in from ten to twenty grains daily. It is the principal article used by jockeys as a *dupe*, given in about five-grain doses, twice a day, in the feed. It soon undermines and destroys the constitution. I condemn, as not only useless but dangerous, the internal use of this agent. It is used to core out old ulcers. (For the best preparation for this purpose, con

taining arsenic, see the prescription given under the head of "Poll-evil.")

Balmomy is tonic, cathartic, and vermifuge; given in anasarca or swelled legs for its tonic effect. Also given in hide-bound.

Balsam of fir forms a good application for cuts and wounds, protecting them from the air. In doses of an ounce it is used in malignant scarlet-fever.

Balsam of Copaiba.—This is a thick, balsamic liquid. It is useful in diseases of the kidneys and bladder, where the water is not healthy. The dose is one ounce, repeated as often as necessary.

Balm of Gilead is a well-known tree. The buds are used. They are stimulating, alterative, and expectorant. They are used in tincture, in doses of from half an ounce to an ounce. Useful in heaves, chronic cough, and chronic rheumatism.

Bayberry.—The bark of bayberry, pulverized, is alterative, astringent, and stimulant. It is used in slavering, diarrhea, grease, and by some in inflammation of the eyes. It is a good remedy, and deserves some attention. The *bayberry-tallow* is a good article in healing and cleansing salves. The bark may be given in doses of an ounce.

Beef's gall is successfully applied to wounds in which splinters, snags, or any other foreign body are remaining. It is used in forming a liniment for the spine and jaws in lock-jaw.

Black Sulphurate of Antimony.—This compound of sulphur and antimony is an alterative much used. It is useful in most constitutional diseases, where the health of the horse is gradually failing and he is losing condition. The dose is from one to four drams, and repeated daily for some time. It is best to give it in combination with sulphur and niter. It should not be resorted to for trifling diseases.

Bloodroot, or red puccoon root, is nauseant and expectorant. It is also a good alterative, and arouses the action of the glands.

generally, and especially the liver. It is useful in all chronic affections of the lungs and air-passages. It has been used as an application to foul ulcers or sores. The dose of powdered bloodroot is from two to four drams.

Boneset is a bitter tonic and nauseant. It is much used by some in affections of the lungs. Dose, from one to two drams of the powdered leaves, twice a day; generally given with other articles.

Burgundy pitch is used in forming charges and plasters, to give them adhesiveness, or stickiness. It is also slightly stimulating to the part to which it is applied. The common pitch may be used as a substitute for the Burgundy pitch. One pound of pitch and one ounce of yellow beeswax, melted together, form a good plaster for sand-cracks.

Camphor.—This is a white substance, commonly called gum-camphor. It dissolves in alcohol, or other spirits. It is generally used in the form of tincture. (See "Tincture of Camphor.") It has often been used as a promoter of condition, given in the form of a camphor-ball. Camphor is narcotic (causing sleep) in its properties. It lessens the action of the heart and arteries, and promotes perspiration. The dose is from one to two drams.

Cantharides, or Spanish flies, is one of the most important remedies in veterinary practice. Their principal use is in the various preparations for blistering. These preparations are described in another place. The tincture of cantharides is given internally, in some cases. It arouses the passion of the stallion, given in doses of from one to a half ounce.

Caraway Seeds.—These are carminative, (removing wind), and highly recommended by some writers in the treatment of colic. They are doubtless good in this disease. They may be given in the form of powder or infusion. The dose is from half an ounce to an ounce, or more. It may be repeated as often as every half hour. But it is best to give it in combination with other remedies.

Castor is stimulant and antispasmodic (reducing pain). It is used in lock-jaw and hysteria. The dose is from one to two drams of the substance itself—from four to six drams of the tincture.

Castor-oil.—This article is only spoken of for the purpose of warning those who may be tempted to rely on it as a physic for the horse, of its utter uncertainty and frequent danger. It would have to be given in a pound or pound and a half dose, and even then it would be uncertain.

Catechu.—This is one of the best astringents used. It may be used in the form of powder, or the tincture may be given. The dose is from one to two drams of the powdered drug; of the tincture, one to two ounces. It is useful in violent purging, or scours. But it is best to give medicine to correct the condition of the bowels, or give it in combination with such.

Caustic potash is one of the most active caustics. It is found in round sticks in the stores. It dissolves or eats the flesh away where it is applied very fast. It produces pain like a coal of fire or hot iron. The stick may be used to open deep ulcers or abscesses.

Common potash.—The common potash is used as a cure for fistula and poll-evil. The pipe, or sinus, is stuffed full of the potash. A most powerful inflammation is excited, and large quantities of matter are thrown out. The inflammation and swelling commence to go down in a few days, leaving a whitish pipe sticking up, which readily comes out. All that is then necessary to effect the cure is rest, and, in some cases, simple dressings, as wet cloths, or some mild salve.

Cayenne Pepper.—This article is generally found as a red powder, and known by the name of *capsicum*. It is stimulant, carminative, (removing wind), and antispasmodic (relieving pain). It may be used wherever a quick and powerful stimulant is necessary. The dose is from ten to twenty grains. It is often used in combination with other remedies. It is sometimes used in the form of tincture, which see.

Chamomile Flowers.—These are a bitter tonic. They are used for the purpose of improving digestion. They may be given mixed with chop-feed—as much as a handful once a day.

Charcoal.—This is an antiseptic, that is, an article that prevents putrescence, or mortification. It is given internally with other remedies, or alone, in diseases where mortification is likely to take place. It is often given with yeast. The dose is several ounces. It is added to poultices.

Chloride of lime is a powerful disinfecting agent, correcting the most offensive smells, arresting putrescence in stables. Harness, mangers, etc., of glandered horses may be effectually purified by washing with a solution of chloride of lime. One pound of chloride of lime to a bucket of water will form a wash of sufficient strength. It corrects the offensiveness of putrid sores and ulcers, and disposes them to heal kindly. Chloride of lime is one of the most important remedies in the treatment of windy colic. (See treatment of that disease.) It loses its gas by the action of the air, becoming wet or moist. The best is dry as flour, for external use. It corrects offensive smells in ulcers, to which it is applied, and stops infection.

Chloroform is a clear liquid, with a peculiar sweetish taste and smell, which evaporates very fast when exposed to the air. It is much used in human practice, in performing surgical operations. It is poured on a sponge or folded handkerchief, and held close to the nose until the patient inhales enough to destroy the sense of feeling, which may be known by pricking the skin with a pin, or pinching it. A little air should be allowed to pass into the lungs with the chloroform; hence, the handkerchief should not be pressed against the nose. Chloroform may be administered to the horse for the same purpose as it is given to man. An experienced finger should be on the pulse while the horse is breathing, and if the pulse should be about to stop, the chloroform should be removed from the nose, and a handkerchief wet with aqua ammonia held close to it.

The quantity required to get the horse under its influence will vary from one to four ounces.

I would not recommend its use in any but the more important operations. It may be used, also, in cases of lock-jaw, to relax the spasm and get the jaws open to administer other medicines.

Cinnamon is stimulant, carminative, and antispasmodic, frequently given with other medicines to improve their action or prevent their griping. It may be used in powder, in doses of one or two drams, or in tincture, in doses of from one-half to one ounce, or more.

Cloves are stimulant, antispasmodic, and carminative. The dose of powdered cloves is from half an ounce to an ounce, to be given steeped in water or in whisky. *Oil of cloves* is a very powerful stimulant, and may be used instead of the powdered seeds. It may be given mixed in mucilage. Dose from twenty to sixty drops.

Colchicum Seeds.—The wine or the tincture of colchicum seeds are the best forms for this remedy. It is used in acute rheumatism, or founder, in doses of two to four drams, and repeated often enough to keep the bowels free. To be given with other alterative cathartics, as cream of tartar, May-apple root, sulphur, Indian hemp, etc.

Copperas.—The article generally known by this name is the *sulphate of iron*. It is also improperly called *green vitriol*. It is properly used in the treatment of old sores. It enters into the composition of several valuable salves. It forms a very valuable wash for old sores by dissolving two drams in a pint of water. This is also good for recent sores. An ounce in the same quantity acts as a mild caustic, and may be used to destroy proud-flesh. The powder is used for the same purpose. It is useful in cases of long-continued discharge from the nose, after catarrh or fever has subsided. To be given in doses of from one to two drams, and better given with ginger or gentian. It has been highly recommended as a cure for

glanders, but it is not reliable. It is not to be relied on alone as a tonic.

Corrosive Sublimate.—This is also called *bichloride of mercury*. It is also a chemical combination of mercury and chlorine. It is used internally as an alterative in farcy, in ten-grain doses, gradually increased to twenty grains, and continued until soreness of the mouth is produced, when its use is to be stopped for a few days, and then used again as before. It is also used in the disease called big-head, as one of the principal articles in a blistering liniment. It is used to kill lice, and in obstinate mange, and as a local application in quittor.

Crane's-bill is an astringent, and used in scours in colts. Dose of the strong infusion from one-fourth to half a pint.

Cream of tartar is a mild, cooling diuretic. It may be given with advantage in many febrile and inflammatory complaints. The dose is from two to four drams, dissolved in water.

Creosote.—This is a straw-colored liquid, with a strong, smoky smell. It is tonic and antiseptic in its properties. It is used both internally and externally to prevent putrefaction, or mortification. It corrects the smell of offensive sores, and disposes them to take on healthy action, or to heal. It may be mixed with twice its quantity of oil, and applied to the sore on a piece of soft muslin, or, to remove very thick fungus, it may be applied pure. Internally it may be given in one-half to one-dram doses in gruel.

Crawly root is the most powerful diuretic used. It is given in inflammation of the lungs. The dose is about two to four drams of the powdered root.

Croton Oil.—This is an oil prepared from the croton-nut. It is the most active cathartic known. It operates with a great deal of griping and rumbling in the bowels. It acts in from six to eight hours. It may be used in cases where it is very important to have a physic act quick. The dose of croton oil for the horse is from fifteen to twenty-five drops. It may be mixed with four or six ounces of castor or sweet oil,

and the whole put in a pint of gruel, and given as a drench. The meal of the croton-nut is preferred by veterinary surgeons. The dose is from twenty to thirty grains, mixed with an ounce of linseed-meal to form a ball, using sufficient palm-oil to form the ball. Croton is useful in severe cases of strangles, lock-jaw, dropsy of the chest or belly. It is not near so dangerous as many suppose.

Cubebs is generally used in powder or tincture. It is stimulant and diuretic, and has a good effect on the kidneys. It is used in treatment of diseases of the kidneys and deranged conditions of the water. The dose is one ounce of the tincture; of the powder, two to four drams.

Digitalis.—This is a foreign plant, the tincture of the leaves being used. It is narcotic, and produces a powerful sedative effect on the heart's action. The mode in which it influences the heart's action is not by regularly diminishing the number of pulsations, but at first, apparently, stopping the heart's action for the time of several beats. When this effect is observed the disease will begin to yield, and the digitalis may be given afterward in only half the dose before used. Digitalis is also a mild diuretic. This remedy sometimes acts very singularly, having no effect until several doses have been given, and then commencing with the same power as if all the doses had just been given in one dose. This is called its cumulative effect. It should be closely watched when given.

Elecampane.—The root of this well-known plant is the part used. It is given in powder, and is useful in chronic lung diseases. Dose from two drams to an ounce; generally given in compounds.

Elixir of vitriol is a cooling tonic. It also improves digestion. From its effect on the human patient, I think it would be good for the horse that sweats too much or too easily. It is used in glanders and farcy. It may be given in doses of from eight to one hundred and twenty drops, in a bucket of water, once or twice a day, or whenever he drinks.

Epsom Salts.—This medicine is too well known to need description. It is given as a physic, in half-pound doses, as a drench. It is sometimes used in the commencement of fevers, in doses of six or eight ounces, and repeated. But it is not equal in such cases to a dose of podophyllin, and, should the case prove to be inflammation of the lungs, would be much more likely to do mischief.

Extract of lead, or Goulard's extract, is the subacetate of lead. It is much used in Europe for inflammation of the eyes, in the early stage, in proportion of a dram to a pint of water. Twice as strong, it forms a good application for inflammation not deeply seated, and is good, mixed with poultices, for inflamed and painful parts.

Galls.—The gall-nuts are parasites growing on the leaves of some species of the oak. They are astringent, and useful in scours, overphysicking, or wherever an astringent is required. The dose is from two to four drams of powdered galls, given in water. Tannin is now generally used in place of galls. The dose of tannin is twenty to forty grains in water.

Garlic is used in the form of a sirup in hysteria, pleurisy, cough, urethral gleet, farcy, indigestion, and rheumatism. Dose, from one to two ounces, generally given in combination with other remedies. It is antispasmodic, expectorant, and alterative.

Gentian.—The root of the plant is the part used. It is found in the solid form, or pulverized, in the drug-stores. It is the principal tonic used in the treatment of the horse. It improves the tone of the stomach. It is generally given with chamomile, ginger, or carbonate of iron. It is used in chronic debility, and also debility following protracted disease. The dose is from two to four drams, repeated daily. A strong infusion of gentian is a good application to putrid sores. The tincture of gentian may be used for the same purposes as the powdered root. The dose is from two to four table-spoonfuls.

Ginseng enters into the prescription for lock-jaw. It is antispasmodic and alterative.

Ginger is a fine stimulant, and seems to improve the tone of the stomach, and promote its digestion. It is much used to improve the action of other remedies, or to prevent them from griping. The powdered ginger is used. The dose is from two to four drams. The tincture of ginger may be used in doses of from one-half to two ounces.

Golden seal, called also yellow root, the botanic name being *hydrastis canadensis*, is the best tonic known for mucous surfaces. It has a most extensive range of application. As a tonic, it may be given with equally good effect when inflammation is actually present and after it has subsided. In chronic diseases of the bowels, indigestion, and loss of appetite, there can be no superior to golden seal. It is also useful in diseases of the kidneys and bladder and chronic cough. It is given in powder, in doses of from one to three drams twice a day. Half a dram of powdered golden seal, mixed in half a pint of boiling water, and allowed to settle, is one of the best applications to sore or inflamed eyes. Golden seal, with an equal quantity of charcoal, is an elegant remedy for flux, or dysentery, and scouring, where there is a tendency to putrescence. To be given in doses of two drams each, twice a day.

Gum-arabic.—This is a white substance, found in the shops in the form of hard grains or fine powder. It dissolves in cold water, forming a mucilage. It is sometimes used in combination with other medicines to make them mix well, or to prevent their acting as irritants to the coats of the stomach and bowels. A mucilage of gum-arabic, formed by dissolving two or three table-spoonfuls of the pulverized article in a gallon of water, forms a good drink in cases of inflammation of the stomach, bowels, lungs, or kidneys. It has a very soothing effect in such cases.

Gum euphorbium is a powerful irritant, and is used in some preparations for spavin.

Gum guaiacum is a brittle, resinous substance. It is used in the treatment of rheumatism or founder. It is combined with other articles; best used in the form of tincture. Dose of the tincture, from two to six drams, two or three times a day. A lump the size of a walnut, burned on a shovel of coals under a horse's nose, in strangles, gives immediate relief, and effects a speedy cure.

Hemlock is sometimes used in place of opium. The powdered bark, or extract, is used.

Honey is sometimes used for mixing other medicines, as balls, etc. It is a good article in healing-salves and cough medicines.

Indian hemp is nauseant, (vomiting), diuretic, (bringing off urine), and cathartic, (purging). It is used in lock-jaw, founder, and bloody urine. The dose of the powdered root is from four to six drams. Dose of the tincture, from two to four drams.

Indigo is antispasmodic, and used in veterinary practice, in the treatment of heaves and thick-wind, in doses of one ounce twice a day, in combination with other medicines.

Indian turnip, powdered, is used in consumption in the horse, in combination with other remedies, in doses of from one to two drams, once or twice a day.

Iodid of potash is found in large crystals of a white color and alkaline taste. It is a superior alterative, but has not been much used by veterinary surgeons. The dose is from twenty to thirty grains. It acts on the glandular system.

Iodine is a mineral found in the drug-stores in the shape of dark, glistening flakes. It is obtained from the sea-weeds. It is easily powdered. It is a very superior alterative, and has been used with satisfactory results in glanders and farcy. The dose of the powdered mineral is from five to twenty grains. Its use must be continued from day to day, for some time. A tincture made by dissolving as much iodine as it will take up

in ninety-six per cent. alcohol, is a good local application to glandular swellings, and will reduce swellings which remain after hurts; also, swollen glands.

Ipecacuanha is found in the drug-stores in the shape of a light-colored powder. It is a fine emetic (a vomit) in human practice. It is a nauseant (sickening the stomach) to the horse. It is used in catarrh, or cold, in combination with other nauseants, in doses of from two to six drams. A horse can not vomit; therefore, nauseating is all that can be done or is necessary.

Iron.—There are several preparations of iron which might be found serviceable in the diseases of the horse.

♦ *The rust, or carbonate, of iron* is a good tonic, given in doses of from one to four drams once or twice a day. The carbonate of iron may be given in the feed.

The sulphate of iron, or copperas, is more powerful than the carbonate, for the same purpose. It has been used in the treatment of that form of glanders which is characterized by only a thin discharge from the nose. It is to be given dissolved in the horse's drink. It is better to give it with gentian or ginger.

Tincture of muriate of iron is good for arresting hemorrhage, or bleeding. It should be given in a pint of water, in doses of one or one and a half ounces.

The persulphate of iron is better for the same purpose, given in water, in doses of one or two drams.

Juniper-berries are stimulant and diuretic (affect the kidneys). They are used in powder, in *thick urine*, the following being a good prescription: Powdered asafetida, one ounce; powdered poplar bark, eight ounces; powdered juniper-berries, two ounces; mix, divide in eight papers, and give one each night and morning in the feed.

Kino is a dark, brittle gum, or extract. It is astringent. Used in diarrhea or scours. Dose, from two drams to an ounce.

Linseed-oil is the oil pressed out of flax-seed. It is used in

the treatment of weak eyes. It is also used to soften the hoof in hoof-bound. It is a physic in doses of from one to two pints, but is not very reliable as a physic.

Linseed, or Flax-seed.—Ground flax-seed is much used in making poultices. For this purpose it is boiled in enough water to make a stiff mush. It is the best poultice used for general purposes. The oil-cake, which is much used by horsemen for improving the horse's condition, is the cake which remains after the oil has been pressed out of the ground seed. It is used in the quantity of one or two ounces a day, in the feed; but the best preparation which has ever been used for improving the condition of the horse is one which I have used for many years, and the knowledge of which is worth double the price of this book to any horseman. Its great superiority consists in its perfect safety and invariable good effect. I never knew of any harm to result from its use. Nothing brings a horse up so quick. The following is the preparation which I have named:

Flax-seed Jelly.—Take one quart of flax-seed, and put it in ten quarts of water, in a convenient vessel, and let it stand over night, or about twelve hours. Then put it over the fire and boil very slowly, until it is boiled down to a thick jelly, which will take about three hours. It must be stirred constantly while boiling, to keep it from burning. To this quantity a double-handful of salt may be added, to preserve it. It will improve its effect, in most cases, to add to the above quantity two ounces of ginger and the same quantity of ground poplar bark, or that quantity of either. The dose is one tea-cupful three times a day, to be given with cut or ground feed. After a week or ten days it may only be given twice a day. If the horse should become too costive, stop the use of the jelly for a few days, or it might be necessary to give a physic, or, what is better, a feed or two of boiled barley.

Lime-water is a good antacid, that is, it destroys the sour-

ness of any thing it is mixed with. It is also astringent, and might be given in doses of from a pint to a quart, in diarrhea, or scours. The following is the formula for the justly celebrated *Carron oil*, for the cure of burns :

Take—Lime-water.....2 parts.

Linseed-oil.....1 part.

Mix. Keep the burned part constantly covered with the oil. If possible, bind muslin cloths, wet in the oil, to the burn.

Lobelia is a powerful nauseant and antispasmodic. It relaxes the whole system, and promotes perspiration. It is used by some as a substitute for tartar emetic, in febrile and inflammatory diseases. It is useful in inflammation of the brain and lungs, pleurisy, consumption, bronchitis, catarrh, or cold, chronic cough, lock-jaw, and founder. The dose is, of the powdered herb, from two to four drams; of the tincture of the leaves, from one-half to two ounces. It may be repeated as often as every eight or twelve hours. *Lobelia* is one of the best antispasmodics, and is certainly very valuable in lock-jaw.

Male fern is used either in powder or the oil of male fern. It is used as a vermifuge. Dose of the powder, one ounce; of the oil, from one dram to half an ounce.

May-apple Root.—This article is used in powder. It is cathartic, nauseant, and alterative, having a most happy effect on the liver. As a cathartic, it is slow in its action, but may be given with aloes or other cathartics, with advantage. When a horse is down in health, and disposed to be costive, or the dung is pale or of an unnatural color, either of the following prescriptions will be found serviceable:

Take—Aloes, powdered.....6 drams.

May-apple root, powdered.....2 drams.

Sulphur.....1 dram.

Mix in a pint of boiling water, and give as a drench. This operates mildly on the bowels. It may be repeated in two or three days.

Take—Aloes, powdered.....6 drams.
 May-apple root, powdered.....2 drams.
 Castile-soap.....4 drams.

Mix, and to be given the same as the above.

The following is a superior alterative:

Take—Sulphur.....4 drams.
 May-apple root, powdered.....2 drams.
 Niter, powdered.....3 drams.

Mix. To be given every two days in a pint of thin gruel, or in chop-feed.

In some cases podophyllin may be used with better effect than the crude root. (See the article on “Podophyllin.”)

Marsh-mallows is a pleasant mucilaginous root, and, soaked in cold water, or given with other medicines, has a very soothing effect on the bowels.

Mercury.—This mineral, called, also, *quicksilver*, is well known. The crude article is used in the formula for quick physic. One part of mercury, rubbed with three parts of lard until no globules of the mineral are to be seen, forms *mercurial ointment*. This is useful rubbed on splints, spavins, and other swellings, to prepare them for blistering or firing. It may be rubbed on freely once or twice a day, but if it should cause salivation, as it sometimes will, its use must be stopped. A weaker ointment is good as an application to malanders and salanders. It is also good in mange, used with six or eight times its weight of sulphur ointment. *Calomel* is a chemical combination of chlorine and mercury. It is not as great a favorite with the veterinary surgeon as with the human doctor. It is used in water faery, jaundice, and mange. The dose is from a scruple to a dram. It may be repeated as often as necessary, but its use should be stopped as soon as redness of the gums is seen. If continued too long it will produce injurious salivation. Calomel is often combined with other cathartics to increase or hasten their purgative action. *Black sulphurate of mercury*, called, also, *Ethiop's mineral*, given in

doses of three drams a day with four drams of cream of tartar, is a good alterative in obstinate surfeit, or foulness of the skin. To be given in a pint of water.

Muriatic acid is a very strong caustic. It enters into some spavin remedies. Muriatic acid, four ounces; water, two quarts; tincture of bloodroot, six ounces; mix; applied by means of a sponge bound to the part.

Muriate of ammonia is a solid, white, crystallized substance. It dissolves readily in cold water. It is used in forming the *cold lotion*, which is made as follows:

Take—Muriate of ammonia.....	1 ounce.
Saltpeter	4 ounces.
Sugar of lead.....	1 ounce.
Salt.....	1 pint.
Cold Water.....	2 gallons.

Mix.

Used in inflammation to cool the part to which it is applied. Muriate of ammonia is also used in thumps and inflammation of the womb, applied over the loins.

Musk is a powerful antispasmodic, used in lock-jaw. The dose is from three to four grains. It is not much used.

Myrrh.—The tincture of myrrh is an excellent application to bruises, saddle-galls, and sores generally. It is made by adding four ounces of myrrh to one quart of alcohol, and letting it stand fourteen days, shaking it daily, and then filtering.

Neat's-foot oil is useful in several liniments. A very good one for the enlarged glands, in strangles, or distemper, is the following:

Take—Neat's-foot oil	8 ounces.
Tincture of camphor.....	2 ounces.
Pyroligneous acid.....	2 ounces.

Mix. To be applied twice a day.

Nitrate of silver, commonly called *lunar caustic*. The use made of this article is for cauterizing old, indolent sores, to

make them heal. Take a stick of caustic, and touch the sore over with it until a white film appears over it. If there is fungus, or proud-flesh, press the caustic well down in it until it is destroyed. It is well to poultice after using the caustic. It is a good remedy for lampas. Pass the stick along all the inflamed bars, until they look white. This is a much milder measure than burning.

Nitric Acid.—Pure nitric acid is a clear liquid, commonly called *aqua fortis*. It is a powerful caustic, burning or eating away the flesh to which it is applied. It enters into the composition of some very good external applications for skin diseases. It has a cleansing effect when thus used.

Nux Vomica.—The nux vomica bean, or dog-button, is a powerful stimulant to the nerves of motion. It is so powerful that experiments in its use have not been extensive. I have been informed, by authority that I regard reliable, that it is a certain and very quick remedy for colic. The bean is rasped or scraped down, and the quantity that would lie on a ten-cent coin given, mixed in water. This dose would be perfectly safe.

Oil of cedar is a popular article in many liniments. It is a good external stimulant. Internally, it is stimulant, antispasmodic, and diuretic. The dose would be one or two tablespoonfuls.

Olive Oil, or Sweet Oil.—This oil is sometimes given as a purgative when better ones are not to be had. A pint is given for this purpose.

Opium is a well-known drug, chiefly brought from Turkey and India. It is more extensively used in medicine than any other article. It is the Samson in the treatment of the horse. It is used mostly in the form of tincture, commonly called *laudanum*. It is narcotic, antispasmodic, sedative, and stringent. It is only narcotic in very large doses. It is principally used where an antispasmodic and sedative are necessary to relieve pain and cramping, or griping. It is not proper to administer it when a high degree of fever is present, but when

the fever is abating its sedative effect is very beneficial. It is used in the treatment of colic, scours, disease of kidneys, diabetes, and lock-jaw. The dose of the tincture is from one-half to one and a half ounces; of the powdered opium, from one to two drams. The powder may be given by mixing it well with warm water. In lock-jaw it may be given as an injection. Its use will be well understood by reference to the diseases in which it is recommended in the body of this work. It is used as an outward local application in some cases.

Oil of spike is a very popular remedy among horsemen. It is used in splint, curb, swoeny, hoof-bound, and spavin. It is generally used in combination with other articles, and rubbed on the affected part. It is a fine stimulating application.

Prussic Acid.—This is a clear liquid, prepared by several different chemical processes. It is the most powerful poison known. It is a sedative, and might be given to a horse with inflammation of the lungs in the dose of twenty to forty drops of the article kept in drug-stores, where other remedies fail to reduce the action of the heart and arteries.

Palm-oil.—This is the best substance for preparing balls or masses, as it dissolves easily in the stomach, and never becomes rancid.

Peppermint is a stimulant and carminative. A strong tea of peppermint may be used freely in colic, and had better be relied on than the mixture of milk and molasses so often given. It is not by any means a bad remedy. A quart of the tea may be given.

Phosphate of lime is a good alterative for changing dull action, and has been recommended in button farcy, in dose of half a dram. I would suggest its use in the disease known as big-head in doses of two to four drams twice a day.

Pleurisy root is expectorant, bringing fluid from the throat, and useful in cases of inflammation or irritation of the lungs. Dose of the powdered drug from half to two ounces.

Podophyllin.—This is the medical principle of the man-

drake, or May-apple, root. It is a brown powder. It has not been much used in the treatment of the horse, but I am sure it will attain high favor among horse-doctors. It is a very slow cathartic; but its good effects commence very soon after it is given. It acts principally on the glands, and especially the liver. It lessens the action of the heart and arteries, and for this reason is very valuable in all cases of inflammation requiring a physic.

The dose of podophyllin for the horse is from thirty to forty grains. The dose should be mixed with a tea-spoonful of ginger, and then mixed with a pint of gruel, and given as a drench. Forty-two grains of podophyllin were given to a fine mare with inflammation of the womb, after all other measures had failed to give any relief. In a few hours the pulse began to decrease and become softer, the breathing became less difficult, and the symptoms generally improved, and by the time the medicine had quit acting on the bowels, all symptoms of inflammation had disappeared. It may be used with equally good effect in strangles, inflammation of the liver, and any other inflammatory disease where physic is admissible. On account of its slowness of action it should be given early in the treatment. It is the best remedy known where a physic is given as an alterative.

Potash.—There are several chemical combinations of potash which are useful in medicine, and some very valuable to the horse-doctor, which I shall now consider. *Niter*, saltpeter, or nitrate of potash, are different names for the same article. Niter is found in many places ready formed by nature. It is also manufactured. It is a very important remedy in our practice. It is one of our principal febrifuges. Its action is to cool the system, lessen the action of the heart and arteries, and increase the flow of urine. It is used in all fevers and inflammations, and affections of the kidneys. It also forms a cooling lotion with water for many local inflammations. The

dose of niter is from two to four drams dissolved in water. It is often given in combination with digitalis, sulphur, etc.

Poplar bark is alterative, changing dull action of parts, and tonic. There are few articles more deservedly popular in the treatment of the horse than this. It may with advantage enter into nearly every prescription given the horse to improve the condition of his system. It has a very happy effect on the stomach and bowels, and also on the kidneys. The old fashion of putting a poplar pole in the stall for the horse to gnaw at is a good practice, and especially if the animal is not in good condition. Powdered poplar bark may be given in the horse's feed. It has been used with good effect in chronic cough, thick-wind, jaundice, worms, and indigestion. Dose, from one to two ounces, once or twice a day.

Prepared Chalk.—This is a pure article of chalk. It is antacid, that is, neutralizes acids, destroying their sourness. It is used in scours, or diarrhea, combined with astringents, as catechu. It might be used with benefit in colic, where no other article is handy. The dose is from two to four ounces in water. In colic it should be given with caraway, prickly-ash, or peppermint.

Prickly-ash.—The bark and berries of the prickly-ash both possess medical properties. It is stimulant, carminative, and antispasmodic. It is generally given in the form of tincture, of the seeds or berries. I have used it with good effect in colic, and am sure it will become a popular remedy in such cases. Dose of the tincture, from two to four ounces, in one pint of water, and repeated as often as every hour until relief is obtained. *Try it*.

Pyroligneous Acid.—This article is one of the best and safest remedies to correct putrescence, or to prevent its occurrence. It is very useful in farcy, strangles, malignant scarlet-fever, grease, lice, mange, fistula, and poll-evil. The dose is from half an ounce to an ounce, twice a day. In some of the

maladies in which it is useful it is used as an external application.

Red Precipitate.—This preparation of mercury is useful to kill lice. Also used in mange. If any thing would disturb bots in the horse's stomach, the following would: Tincture of opium, one ounce; saleratus, one ounce; spirits of niter, one ounce; red precipitate, five grains; whisky, one pint; mixed, and given as a drench. But those who have read the article in this work on "Bots," will not be likely to ever use the above prescription.

Rosin.—Yellow rosin, or resin, is what remains after oil of turpentine is distilled off. Internally, it is stimulant and diuretic, and useful in cough, heaves, and thick-wind, and in diseases of the kidneys. The dose is from half to one ounce of powdered rosin, given in cold water, or mixed with the feed. Externally, it is used in making several ointments. *Beeswax* is used with it in making plasters and salves, forming the body of several of them.

Sage is a popular carminative in domestic horse practice. As a wind-expeller, it certainly has some merit. It is given in tea, in doses of several pints. It is an article that does no harm, at least, and hence is superior to most of those articles thrown into the horse's stomach for bots, colic, etc. But in giving it, leave out the milk, for it will do harm. It is a good article to give some other medicines in.

Salts of tartar, or carbonate of potash, is antacid and diuretic. It is used in inflammation of the womb and some diseases of the kidneys. It is a very good remedy to correct sourness in the stomach or bowels. The dose is from one to four drams.

Sarsaparilla is a fine alterative, though not nearly so much used in veterinary practice as in the common practice of medicine. It is used in farcy, in powder, in doses of from one to four drams, twice a day. It may also be used in infusion. Sarsaparilla is certainly a much better remedy with the horse than is generally supposed.

Sassafras is an alterative and diuretic. The oil of sassafras is used in founder, in doses of from one to two ounces, and repeated twice a day, if necessary. Oil of sassafras enters into the composition of nearly all horse liniments.

Skunk cabbage is nauseant and antispasmodic. It is useful in coughs. The dose is from one to four drams of the powdered root. To be repeated once or twice a day.

Slippery-elm.—The powdered slippery-elm bark is much used for poultices, which are made by mixing it in sufficient cold water to make the poultice the right thickness. It is used with medicines given internally, for the purpose of protecting the bowels. It has a very soothing effect when the bowels are irritated, and the water off the bark may be given with benefit when the mucous coat of the stomach is irritated.

Spanish brown is a well-known article in the arts. It is used in veterinary practice in heaves and thick-wind, and as an article in a dupe, by those who are foolish enough to give such articles. It is given in doses of one or two ounces.

Strychnia is a most powerful poison. It stimulates the spinal nerves to overaction. It is too powerful to be tampered with. It has been given as a dupe in doses of one grain, twice a day, in the feed. It is powerfully exhilarating. The sulphate of strychnia is the form it is used in.

Sulphur is found in the stores in two forms, in roll and flours of sulphur. It is alterative in its action. It is used in a great many different diseases and different combinations. It is a great promoter of condition, combined with niter and antimony. It is seldom given alone. It is the principal article in the application for mange. It is much used by some in all chronic affections of the lungs and air-passages, as heaves, thick-wind, cough, etc. The dose is from one to two ounces. It is used in my favorite condition-powder.

Soda.—There are two preparations of soda, useful in treating the horse. The first is the well-known article, *common salt*, or chloride of sodium. This is the only article of medicine

often needed by the horse, even in health. He should have it several times a week. He can hardly have too much, if it is often given. It is necessary to healthy digestion. It is elegant on the food after severe illness. Half a dram of salt in four ounces of water, makes a good eye-water. Strong salt-water is a good wash for sore shoulders and back. A double-handful of salt and one-fourth of a pound of soap, dissolved in a gallon of water, form a good cathartic injection. When a horse is not eating, he may have thin gruel with salt in it, which he will drink instead of water. It will nourish him and improve his appetite.

Chloride of soda is a good disinfectant, but not so good as chloride of lime. One part of chloride of soda dissolved in twenty-four of water is a fine application to fistula, poll-evil, and farcy sores.

Soap.—Castile-soap is sometimes combined with cathartic balls, to make them dissolve quicker. It is diuretic. It is properly used in washing and cleansing sores.

Sugar of lead is found in the stores, in the form of coarse crystals. It is white, and has a sweetish, astringent, or puckering taste. It is used as an astringent, in inflammation of the eyes, in proportion of one or two drams to a pint of water. It is used in diabetes and inflammation of the womb, which see.

Sulphuric Acid.—Impure sulphuric acid is much used for mechanical purposes, under the name of oil of vitriol. This is unfit for medical use. The pure sulphuric acid is of a dark brown color. It is a caustic, used externally in grease-heel and scratches, in the prescriptions given under those diseases. Internally, it is a tonic, improving the appetite and digestion. The dose is from one to two drams, in a bucket of water, once or twice a day.

Sulphuric ether is a clear liquid, with a peculiar sweetish smell, and evaporates very fast when exposed to the air. It is a powerful antispasmodic (relieving pain). Its effects are similar to chloroform. It is more frequently used internally

than chloroform. It is used in lock-jaw, colic, and painful spasmodic diseases generally. The dose may vary from one-half to two ounces.

Sweet spirits of niter is a clear liquid, possessing a pleasant smell. It is stimulant, febrifuge, and diuretic. It is one of the safest and best remedies. It is useful in all febrile and inflammatory diseases, and diseases of the urinary organs. It is often recommended in this work. It lessens the heat of the system and the action of the heart and arteries. It is generally given with other remedies. The dose is from two drams to an ounce.

Tartar Emetic.—This is a preparation of antimony, and is a heavy, white powder. It is one of the principal remedies used in the treatment of the horse. It is a very valuable nauseant, and has a good effect on the skin, promoting perspiration. It controls, to a great extent, the action of the heart and arteries. It is used in most cases of fever and inflammation, particularly in lung-fever, pleurisy, and other affections resulting from cold. It is generally given in combination with niter and digitalis, in a pint of warm water, and repeated as often as every two hours, until the desired effect is produced. The dose is from one to one and a half drams.

Tar.—Equal quantities of tar and grease melted together form the common stopping for the feet. It is warm and stimulating, and useful to bruised or wounded feet. Where the hoof is broken, and the inner soft part exposed, it prevents dirt, water, or air from entering. Tar should form the basis of applications for thrush. Its adhesiveness, or stickiness, renders it useful in applications for mange. The *oil of tar*, mixed with an equal quantity of fish oil, is a superior application for hard and brittle hoofs; to be applied to both sole and crust with a brush every night, and well rubbed in. Tar is also useful in chronic cough. It may be given in two to four drams, mixed with other cough medicines, or given alone.

Tannin is a very powerful astringent. It is used in scours.

The dose is from twenty grains to one dram. It is useful in stopping blood. Cotton may be rolled in the powder and pressed into the cut or wound.

Turpentine, commonly known by the name of *spirits of turpentine*, is a well-known article. It is much used in colic, generally in combination with other stimulants. It is a powerful antispasmodic, and hence its use in colic. It is also a good diuretic. The dose is from half an ounce to an ounce. It forms a tincture with Spanish flies, which is a good blistering liquid. The following is the mode of preparing it: To a pint of turpentine add an ounce and a half of powdered flies; shake well. It is better to let it stand twenty-four hours. This is rubbed thoroughly over the part it is desired to blister, with the hand. It does not blemish.

Valerian is antispasmodic, and exerts a calming influence over the action of the heart. It is used in hysteria and lock-jaw. The dose of the powdered root is from two to four drams; of the tincture, from one to two ounces.

Venice turpentine is a stimulant like all other kinds of turpentine. It is put on rowels to make them get to running quickly.

Veratrum Viride.—This is the American or green hellebore. The tincture has been much used in human practice for a few years. It lowers the action of the heart and arteries, and nauseates the stomach. There are two tinctures used—Norwood's and the common tincture. I think this article might be substituted, in treating the horse, for digitalis. For the horse, the dose of Norwood's tincture of veratrum viride would be about one or one and a half drams; of the common, about four drams to an ounce.

Verdigris.—This is an *acetate of copper*, and called *green vitriol*. It is used internally, as a tonic, in doses of from two to four drams, every day. It is also given in farcy the same way. It eats out proud-flesh and stimulates old sores to heal. It is applied in powder, either alone or with an equal quantity of sugar of lead, for this purpose. An article for the cure of

cankered or ulcerated sore mouth, and a good application for thrush, called *Egyptiacum*, is made by boiling verdigris in vinegar and honey. Verdigris is an uncertain remedy internally, and not at all free from danger. It should be used with much care.

Vinegar.—Good vinegar is used in preparing some medicines, and may be used with advantage in preparing many preparations for coughs and other obstructions of the lungs.

White Hellebore.—This is a powerful nauseant, and exerts great power over the action of the heart and arteries, lessening the frequency of the pulse. Hence, it is very useful in inflammation, particularly of the lungs. It must be given with much care, the pulse being closely observed. If its effect is pushed too far, trembling, giddiness, and purging follow, and death may be the result. The dose is from one scruple to half a dram. This remedy is but little known in this country.

White lead is sprinkled on red and inflamed, or swelled legs, where moisture is exuding through the skin. It may be mixed with poultices or paste for such cases.

White-oak bark is astringent and tonic. A strong tea, or infusion, of it is much used as a wash for severe bruises or local inflammation. It may be used in diarrhea, in infusion, or the powdered bark may be used. It may be used in large doses and repeated often. In applying it to a wound or inflammation, the part should be bathed very frequently. The inner bark is to be used.

Wormwood is a very bitter plant. The stock and leaves are boiled to a strong tea, or infusion, which is used for the purpose of reducing swelling or inflammation. The part is to be often bathed with the infusion, and the boiled plant bound on the part, if practicable to do so.

Worm-seed is used for destroying worms, in doses of two ounces, pulverized, generally in combination with other remedies. The dose of the oil of worm-seed is one ounce.

Yeast is an antiseptic, and useful in putrid diseases, or

diseases about to run into a putrid condition. It may be given in half-pint or pint doses, and repeated every six or eight hours. It is advantageous to give charcoal with it.

Yellow dock is used, for its alterative and tonic properties, in farcy. Its influence on skin eruptions is considerable. It is used as a medicine by some human physicians in the cure of syphilis.

Yarrow is a stimulant, antiseptic, astringent, and antispasmodic. It is used by some practitioners in farcy and glanders, by insertion under the skin, in connection with other articles, for its intoxicating and antiseptic properties. (See "Treatment of Farcy.") The bruised leaves are used.

Zinc.—The impure carbonate of zinc is called *calamine powder*, and is the principal article in the calamine ointment. It is prepared as follows: Five parts of lard and one of rosin are melted together, and then two parts of calamine powder, in very fine powder, are stirred in as it cools. It is a very useful healing ointment. The calamine is useful, sprinkled on cracked heels and outside sores.

White vitriol, or sulphate of zinc, is good for inflamed eyes, three grains being dissolved in an ounce of rain-water; to be used after the higher degree of inflammation has passed away. It is the best remedy in quittor, as much as the water will dissolve being injected into the sinuses, or openings. A weak solution of sulphate of zinc forms a good wash for grease or scratches.

INSTRUMENTS AND APPARATUSES.

THE most important instruments and apparatuses used in veterinary practice will now be referred to. It is not expected that every owner of the horse will have use for all of them, but he should know their use.

The twitch is a loop of leather, or cord, on the end of a stick, or mace, about two feet in length. The upper lip is passed through the loop, and by twisting the stick the head is held securely.

Hobbles.—There are many forms of this apparatus. To hold a horse for performing operations I use the following:

A leather or rope collar is passed around the neck. A rope is then tied to the lower part of this collar, and passed back between the fore-legs, and tied around one of the hinder pasterns; this rope is then carried back through the collar, and placed in the hands of an assistant. Another rope is similarly passed to the other hind-leg, and placed in the hands of another assistant. If the horse is not to be cast, the ropes may be tied to the collar, when brought back, instead of being put in the hands of assistants. By this contrivance the horse is effectually prevented from any vicious action. He may also be successfully cast, or thrown, by it, one person managing his head.

Stocks are a frame, more or less complicated, in which a horse is secured and lifted off his feet. They are too expensive for general use.

The Sling.—This apparatus is used for keeping a horse's weight off his feet. It is used in treating fractures or broken bones. It consists of a broad girdle of leather or heavy canvas, to pass under the belly and chest. In each end of the girdle is fastened a stout rod. Straps are also attached to it, to pass around the hips, and also around the breast, to act as breeching, or stays. Loops are attached to each of the rods, one at

each end and one in the middle. Two pairs of pulleys are necessary, one for operating on each side, when slinging the horse. One is fixed to a beam, or joist, and the other, by its hook, is attached to the loops fastened to the rod at the end of the girdle. The rope is fastened to the ring of the lower pulley, and then passed over the upper one, and then around the lower one, and then again over the upper, and carried to a convenient place to be fastened. Both pairs of pulleys being fixed, the horse can easily be raised by drawing on the ropes.

Knives used in operating on the horse should be of good metal and very sharp. The larger-sized *scalpel* is a convenient knife for most purposes. A heavy *bistoury*, which is a long, narrow-bladed knife, is the best for opening deep wounds or abscesses.

Lancets.—There are three kinds in use, (they are all used for bleeding), the fleam, which is used by most bleeders, the spring-lancet, and the thumb-lancet.

Scissors.—The *roweling scissors* are the most convenient for the veterinary surgeon. They have a rounded point, which is the best instrument for raising the skin, in roweling.

Needles.—A large, curved, square needle is the proper sort of one for the veterinary surgeon. He should also have one or two of small size for sewing up delicate parts.

Seton Needle.—This instrument has a broad, slightly curved blade, of about three inches in length, and a round shaft about eighteen inches in length, with a large, long eye in it. It is used for introducing setons.

Forceps are long-jawed pincers for various purposes. Some are made for extracting snags, pieces of bone, etc.—the artery forceps for grasping the end of a bleeding artery, for the purpose of tying it.

Drawing-knife.—The same that the blacksmith uses, and for the same purpose, to pare out the hoof.

Firing-iron.—This is a heavy piece of iron the shape of a razor-blade, but longer, and the edge blunt, with a long tongue

to go into a wooden handle. It is used by some in treating spavin, ring-bone, calluses, etc.

Syringes.—These are well-known instruments. In giving the horse injections, the largest syringe should be used, or some of the patent ones, which do not have to be withdrawn during the operation. Smaller syringes are used for injecting abscesses, etc.

Probes.—These are made of silver. A piece of wire, with the end made smooth and rounded, makes a good probe. The probe is used for ascertaining the depth and direction of wounds, and if any thing is in them. They are very useful.

Catheters.—These are long, round, gum-elastic tubes, with one end open and rounded at the other to a point, near which are two openings. They may be used for injecting fluid into deep ulcers. Introduce the catheter and then the mouth of the syringe into the open end of the catheter, and throw the liquid into the wound through it. A large catheter is used for drawing off the water, when the horse is unable to pass it.

Rowels.—Cut a ring of leather about an inch, or over, in diameter, leaving the rim of the ring about one-fourth of an inch broad. Wrap it with flax or hemp, or thread will do. A hole is cut in the skin, and the skin loosened in a long pocket, two or three inches down. The rowel is then moistened with Venice turpentine and passed down to the bottom of the pocket. The next day it will commence running. It is to be left in until it accomplishes the object or quits running.

Setons.—A seton is a cord, or bundle of thread, drawn through a portion of the skin or flesh, and the ends being tied. The seton is smeared with turpentine. A seton is introduced with the seton-needle. Its object is to keep up a discharge of matter and reduce inflammation.

Tents.—Plugs, or pledgets, of tow, lint, or leather or wire wrapped with tow, make good tents. They are introduced into wounds or sores, to start them to mattering, and to make

them heal from the bottom. The tent is moistened with Venice turpentine before it is introduced.

Thread.—The proper kind of thread, for sewing up wounds, is the largest-sized surgeon's or saddler's silk. It should be white, and waxed with beeswax. A finer cord may be used for sewing up delicate structures, as intestines, etc.

Surgeon's Knot.—This is very simple, when once understood, and quite as useful as simple. It is made by passing one end, or arm, of the thread twice around the other, and then drawing the knot tight. No second knot is necessary, for this knot will hold in tying any wound or bleeding artery.

Sutures, or stitches, are made for the purpose of drawing a wound together. A needle, armed with a thread, or cord, is passed through the lips of the wound, and the cord drawn sufficiently through; then a surgeon's knot is tied on the cord, by which the lips of the wound are drawn together. Both arms of the cord are then cut off about three quarters of an inch long. Sutures should be close enough to bring the lips of the wound together all along.

Ligatures are applied to wounded arteries. A cord is passed round the artery and tied in a surgeon's knot on it. A pair of forceps are necessary to grasp the end of the artery, to hold it until it is tied, or a fine, sharp hook may be used to get hold of the end of the bleeding artery, and draw it out to be tied.

Drenching-bottle.—Different contrivances are used for giving a horse a drench. A quart wine-bottle is at once the most easily obtained, and quite as good as any other. The drench is in liquid form, or mixed in some liquid, as water, thin mucilage, sage tea, etc. The drenching-bottle is filled. A bridle is put on the horse, and the reins thrown over a beam, or limb of a tree, and the head drawn up by an assistant until the nose is elevated above a level. The operator then stands on a chair, or box, at the off side, and takes the bottle in his right hand, and gently introduces the neck of the bottle into the

mouth at the side, between the nippers and grinders, and when the neck of the bottle is well back in the mouth, the body of the bottle is raised, and its contents emptied into the back part of the cavity of the mouth. The horse may refuse to swallow, holding the drench in his mouth. In this case the bottle is to be taken in the left hand, and the tongue grasped around its body with the right hand, and drawn forward by a twisting motion of the hand. This compels him to swallow. A very good method of giving a drench is to have a horn, with the small end cut off. This is introduced into the mouth, as a funnel, and held there, and the drench turned into the large end. If the horse swallows well, this is an elegant method. It is free from any danger of breaking, which requires such care in using the bottle.

Injections, or Clysters.—These consist of certain articles thrown into the last bowel, or rectum, to produce an action on the bowels. They are very valuable in assisting physic in acting. They are too much neglected, and especially in severe diseases, where a speedy action on the bowels is necessary. A very large syringe, or one of the recent patent syringes, which do not have to be removed during the operation, should be used. The pipe should be oiled, and then carefully introduced, so as not to frighten the horse. The fluid should be thrown up the bowel about blood-warm.

The following are good injections: Two ounces of hard or yellow soap, dissolved in a gallon of warm water, the whole to be used at once. A still more active one: Epsom salts, half a pound, dissolved in a gallon of water; or common salt may be used instead of the epsom salts. For a still more active injection, dissolve one ounce of aloes in ten quarts of warm water. But this should not be used if much physic has been given. Warm water alone is a good injection.

In cases of overpurging, or inflammation of the bowels, two or three quarts of gruel, to which three or four ounces of pre-

pared chalk and a dram of pulverized opium should be added, is very soothing.

When a horse refuses to eat for too long a time, gruel injections, of one or two quarts at a time, may be used several times a day.

Sweating Apparatus.—The most speedy and effective method of sweating the horse is to put on him a light set of harness, and fasten three sticks, about two feet and a half long, one across at the collar, one at the back-band, and one at the hips. A wagon-cover, or sheets sewed together, is then to be thrown over the horse and pinned around the neck close to the head, and down in front and behind, so that no air can get in or pass out. The cover must come to the ground all around the horse. The sticks are to hold it out from lying close to the body. A cup, or deep saucer, filled with whisky that will burn, is then introduced under the side of the cover and set on fire. Another cup may be introduced under the other side. A great amount of vapor is thus formed, and the most free sweating will be produced, which may be kept up for half an hour or an hour. It may be repeated as often as necessary. After using it, the horse should be rubbed dry and blanketed. This *whisky sweat* is useful in colds, inflammations, and many chronic diseases. It reduces the pulse, relieves internal congestion, and keeps the skin active. It is particularly valuable in rheumatism or founder, and may be repeated every day.

MISCELLANEOUS RECIPES.

THE following recipes are very valuable, and may be relied on in all cases when their use is called for. Many of them are very convenient, and may be kept constantly on hand for use. They are superior to the various patent medicines so much recommended for the horse.

LIQUID BLISTER.

Take—Powdered Spanish flies.....1½ ounce.

Spirits of turpentine.....1 pint.

Mix thoroughly by shaking. May be used at once, but better to stand twenty-four hours. To be poured in the hand and well rubbed on the part to be blistered, until the horse becomes sensitive to its action. It will blister in fifteen or twenty minutes under favorable circumstances. I seldom use any other blister.

QUICK PHYSIC.

Take—Croton oil.....20 drops.

Crude mercury.....5 grains.

To be given mixed in a pint of gruel; or rolled in a ball of wheat-dough, and forced far back in the mouth. To be given in extreme cases only.

COMMON PHYSIC.

Take—Barbadoes aloes, powdered.....1 ounce.

Ginger.....¼ ounce.

Warm water.....1 pint.

Mix, and give as a drench.

Another.

Take—Linseed-oil 1 pint.

Powdered aloes.....1 ounce.

Spirits of turpentine.....1 ounce.

Warm water.....1 pint.

Mix, and give as a drench. Good in colic.

CONDITION POWDER.

Take—Ginger.....4 ounces.

Black antimony.....2 ounces.

Sulphur.....2 ounces.

Saltpeter.....2 ounces.

Rosin.....2 ounces.

Mix, and give one tea-spoonful three times per day, in the feed.

Another.

Take—Bloodroot	2 ounces.
Yellow-root.....	2 ounces.
Black antimony.....	1 ounce.
Salt peter.....	2 ounces.

Mix, and give one tea-spoonful twice per day, in the feed.

STICKING-PLASTER FOR CUTS IN THE HORSE.

Take—Burgundy pitch.....	4 ounces.
Tallow	2 ounces.

Melt the articles together and spread on linen or cotton cloth while hot. Cut in strips of proper length and width, draw the wound together, warm the strips, and apply them. It is best to clip the hair short where the plaster is to be applied.

COUGH POWDER.

Take—Tartar emetic.....	1 ounce.
Pulverized rosin.....	2 ounces.
Pulverized bloodroot.....	1 ounce.
Salts of tartar	2 ounces.
Ginger	2 ounces.

Mix, and give one tea-spoonful three times a day, in the feed.

COUGH DRENCH.

Take—Sweet spirits niter.....	1 ounce.
Sulphate morphia.....	13 grains.
Balsam copaiba.....	1 ounce.
Warm water.....	1 pint.

Mix, and give at once. Repeat, if necessary, in a few days.

FOR COLIC.

Rasp one dog-button, and give the powder in a pint of warm water. Said to cure. I have never tried it.

HEALING SALVE.

Take—Rosin.....	2 ounces.
Beeswax.....	2 ounces.
Tallow.....	2 ounces.
Spirits of turpentine	1 ounce.
Oil of spike	1 ounce.
Gum camphor	$\frac{1}{2}$ ounce.

Melt all together over a slow fire, and apply daily. Superior to any "*Mus-tang Liniment.*"

OINTMENT FOR SWELLING.

Take—Oil of origanum.....1 ounce.
Spirits of turpentine.....1 ounce.
Aqua ammonia.....1 ounce.
Alcohol.....2 ounces.

Mix, and apply twice a day, rubbing it well in.

TO KEEP FLIES FROM BLOWING WOUNDS.

Make a decoction, or strong tea, of *black walnut* leaves, and wet the wound and parts by it, once or twice a day with it.

Another.

Fish oil, rubbed about the sore or wound; or *tar*, used in the same way.

TO PREVENT COLLAR CHAFING.

In the spring, when commencing work, or with young horses, for about one week, every evening, on unharnessing, bathe the shoulders with alcohol, one part, and cold water, two parts. This toughens the shoulder, and prevents galling and scalding. If the collar is not good, better throw it away.

TO MAKE A STAR ON THE FOREHEAD.

Shave the hair off the size the star or blaze is desired, and anoint the part shaved with oil of vitriol, using a feather or camel's-hair pencil. After using the vitriol, the place will become quite sore. It may be healed by washing it occasionally with copperas-water.

TO PREVENT CATCHING DISEASES.

Asafœtida is generally known to have the effect of protecting horses from contagious, or catching, diseases. It is always prudent to use it when such diseases are in the neighborhood, and it would be well to keep it on hand, and use it occasionally at other times. Tie half an ounce in a strong rag, and nail it in the trough, or manger; also, another piece in the bottom of the watering-bucket. On a journey, a bit of the asafœtida may be put in a rag and tied to the bridle-bit. The asafœtida, thus used, not only prevents the horse from taking disease, but improves his coat, his appetite, and his spirit.

TO CLEANSE OR PURIFY INFECTED STABLES.

Disinfectants are articles which destroy unpleasant smells, the contagiousness of disease, or render harmless poisonous vapors and substances. The articles of this class most used are chloride of lime, chloride of soda, quick lime, charcoal, sulphur, and asafœtida. Laborack's solutions are much esteemed by human doctors. For cleansing stables in which horses, having glanders, farcy, strangles, mange, or big-head, have been kept, scrub all parts of the stall, manger, rack, etc., and then burn sulphur so as to fumigate the stall or

stable perfectly ; then whitewash the entire stall, manger, rack and other parts with a solution of chloride of lime. The gearing, halters, or bridles used about the diseased horse should be similarly treated, or thrown away. Freezing will remove the infectiousness of most diseases.

TO DRIVE MAGGOTS OUT OF A SORE.

Pour a few drops of spirits of turpentine on them. They will decamp in a hurry. Pyroligneous acid will drive them out, and prevent the fly from depositing the eggs.

COLD LOTION FOR INFLAMMATION.

Take—Saltpeter.....	4 ounces.
Sugar of lead.....	1 ounce.
Muriate of ammonia.....	1 ounce.
Common salt.....	1 pint.
Cold water.....	2 gallons.

Mix, and bathe the part affected often.

TO ABATE SWELLING CAUSED BY HURT.

Take—Common wormwood.....	2 ounces.
New England rum.....	1 quart.

Steep the wormwood in the liquor, and bind the herb on the part, and keep it wet with the liquor. Other spirits would answer in place of rum.

Another.

Keep the part constantly bathed with an ooze of white-oak bark.

TO PREVENT INFLAMMATION OR SWELLING FOLLOWING A BRUISE OR SPRAIN.

Keep the part constantly wet with the following :

Take—Tincture of arnica.....	1 ounce.
Cold water.....	1 quart.

Mix.

TABLES OF WEIGHTS AND MEASURES.

MEDICINES are directed to be given either in a dry or liquid form. They are weighed or measured by the apothecary, when obtained of him. But it is not always that weights and measures are at hand when the farmer wishes to give his horse medicine. There are certain quantities which are nearly accurate, as equivalents of the common weights and measures gen-

erally used, as the tea-spoonful, table-spoonful, wine-glassful, tea-cupful, and tin-cupful. These measures may be used in all cases, except where very powerful medicines are used.

TABLE OF APOTHECARY'S WEIGHTS.

This weight is used by the apothecary or druggist in putting up medicines to be given in small quantity.

20 grains (marked <i>Gr.</i> ,)	make 1 scruple.
3 scruples “	℥, “ 1 dram.
8 drams “	℥, “ 1 ounce.
12 ounces “	℥, “ 1 pound, (℔).

Figures placed before, or Roman numerals placed after, the above characters show how much of the weight represented by the character is to be used, thus: 10 *grs.* means ten grains; 2 ℥ means two drams; *grs.* vi means six grains; ℥ ix means nine ounces, and so on. Of any light powder, as powdered roots, leaves, or bark, a *grain* is about what would lie on one-fourth of an inch of the point of a pen-knife blade; a *scruple*, about half a level tea-spoonful; a *dram*, about one rounding tea-spoonful; an *ounce*, about two rounding table-spoonfuls; a *pound*, a pint-cupful, packed. If the article is heavy, as salt, saltpeter, loaf-sugar, etc., it will require only from one-half to two-thirds the above bulks to make proper weight. Some very light articles would require more than the above quantities.

FLUID MEASURE.

Used in measuring liquids, as water, tinctures, liquors, infusions, sirups, etc.

60 minims (marked <i>℥</i> ,)	make 1 dram.
8 drams “	℥, “ 1 ounce.
16 ounces “	℥, “ 1 pint.
8 pints “	oct., “ 1 gallon, (<i>cong.</i>)

In this measure the ounce and dram are sometimes written “fluid-ounce” and “fluid-dram,” and an *f* is sometimes placed before the character, thus: *f*℥ x means ten fluid ounces. A *minim* is one drop—of some liquids more, of others less; a *dram* is about one tea-spoonful; an *ounce* is about two table-spoonfuls; a *pint* is a pint bottle or tin-cupful.

If medicines are very powerful, in which it is necessary to be very particular about the size of the dose, the weights and measures according to the above tables should be used; in other cases, the approximate weights and measures above explained, will be sufficiently accurate.

DICTIONARY.

A

- ABDOMEN**, the belly.
- ABORTION**, foaling before the young animal can live.
- ABRUPT**, sudden; rude; quick.
- ABSCESS**, a swelling or cavity containing matter or pus.
- ABSORBENTS**, (see the article in this book on "Absorbents.")
- ABSORB**, to swallow up.
- ABSORPTION**, soaking, or taking up by fine vessels called absorbents.
- ACCELERATE**, to make quicker or faster.
- ACID**, sour. There are several kinds.
- ACUTE**, sharp; an acute disease, one quick in its approach; violent.
- ADAGE**, an old saying or proverb.
- ADHESION**, a sticking together.
- ADHESIVENESS**, the property of gluey substances.
- AERATION**, exposing to the air, such as the blood in the lungs, to free it from carbon.
- AFFINITY**, nearness; the quality which causes the parts of a substance to keep together.
- ALBUMINOUS**, resembling the white of an egg in substance.
- ALTERATIVE**, a medicine which generally improves health mildly.
- ALIMENT**, the food.
- ALIMENTARY CANAL**, the bowels.
- ANALOGY**, resemblance; likeness.
- ANALYSIS**, to consider separately any thing in parts; to separate.
- ANATOMY**, the description of the different parts of the animal body.
- ANCHYLOSIS**, the stiffening of a joint permanently.
- ANTAGONIST**, one that opposes another.
- ANTERIOR**, before; the front part of the body.
- ANTISPASMODIC**, a medicine that relieves spasms or cramps.
- ANTISEPTIC**, medicines which stop decay or decomposition. Septic poison is a deadly poison in all dead bodies not bled to death.
- ANUS**, the outlet of the bowels at the tail; the fundament.
- APPENDAGE**, an addition; an ornament, such as the hair, etc.
- APPRECIATE**, to set a value on; to understand the value of.
- APPROACH**, to come near to.
- APPROXIMATE**, near to.
- ARTICULATE**, to join end to end, as bones in a joint.
- ARTICULATING**, working hinge-like.
- ASPHYXIA**, death by depriving the lungs of air.
- ASSIMILATE**, to make like.
- ASTRAGALUS**, the name of the largest bone of the hock-joint below the os calcis.
- ASCEND**, to climb or go up.
- ASTRINGENT**, a medicine that contracts or puckers.
- ASTRINGENTS**, medicines which stop discharges, by contracting the parts, such as blood, mucus, etc.
- ATROPHY**, a wasting away of the parts.
- AUGMENT**, to increase.

AUTHENTICATED, made certain.
 AVOCATION, a business.
 AZOTE NITROGEN, an element of many articles of food, especially of flesh.

B

BALKING, refusing to pull or go forward.
 BASE, foundation.
 BENEATH, under the lower part.
 BESTUD, to set thickly; to cover with patches or spots.
 BEVELING, cutting with a slope or bevel.
 BILIARY, relating to the bile.
 BOOT, a leather boot worn to prevent one foot cutting the other, called, in Europe, buffer.
 BOUNDED, surrounded.
 BOUGIE, an instrument to open the urethra, or urinary passage.
 BREEDING IN AND IN, putting a mare to a horse of the same family or stock.
 BRIDOOON, an extra bridle-bit used in conjunction with another, each having a separate rein.

C

CANNON-BONE, the shank, or bone below the knee or hock.
 CANKER, the name given a certain kind of eating sores.
 CAPSULAR LIGAMENTS, the ligaments surrounding the joints.
 CAPSICUM, Cayenne pepper; a small red pepper.
 CAPILLARIES, the little fine vessels connecting the arteries and veins.
 CARMINATIVES, medicines that drive wind out of the stomach and bowels.
 CARBON, the principal part of wood; charcoal is impure carbon; poisonous substance in the blood, extracted by the oxygen of the air in the lungs; diamond.
 CARCASS, the animal body.
 CARTILAGE, gristle; a smooth white substance covering the ends of bones moving or working on each other, as in joints, etc.
 CARPED, gathered up; rounded.
 CASTRATE, to deprive of the seeds, or testicles.

CATHETER, an instrument to draw off the water, urine, etc.
 CATHARTIC, medicines which move the bowels; a physic.
 CAUTERIZE, to burn the flesh with medicine or a hot iron.
 CAUSTIC, a medicine which burns or destroys the flesh, when touched with it.
 CAVITY, a hollow, low, or open space.
 CELEBRITY, distinction; greatness; famousness.
 CELLULAR TISSUE, the tissue that joins the skin to the body, and unites the parts or fibers of the muscles, and in which the fat is deposited.
 CHAFF, a name given to cut feed, hay, straw, etc.
 CHARACTERISTIC, a symptom of character; a disposition of, or a natural and general instinct.
 CHARACTERIZE, to distinguish.
 CHEMICAL, relating to chemistry.
 CHRONIC, a lingering disease, after the acute stage.
 CIRCUMFERENCE, the distance around any thing.
 CIRCUMSCRIBED, marked around, limited.
 CLEFT, a notch; a division; a furrow.
 COAGULATE, to clot, or thicken like blood, or become like jelly.
 COAGULABLE LYMPH, albumen, which see.
 COEXIST, to be or exist together.
 COHESION, sticking to; sticking together.
 COHORT, a large number.
 COMBUSTION, burning.
 COMPONENT, entering into as a part.
 CONCAVE, a hollow, or cupped surface; the opposite of convex.
 CONCEPTION, the act of getting with young, after service by the male.
 CONDITION, in good plight; fleshy.
 CONGESTION, the clogging of the blood in the parts, lungs, etc.
 CONSTITUTING, forming; making up.
 CONTAGIOUS, catching; infectious diseases are contagious.
 CONTACT, lying or coming together.

CONTRACTION, drawing up; narrowing.
 CONTRAST, a difference of color, shade, or form, etc.
 CONVEX, oval, or rounding; the opposite of concave.
 COPIOUS, plentiful, abundant.
 CORONET, the upper part of the hoof, where it joins the skin.
 CORONARY RING, (see description of foot, page 414.)
 CORROBORATE, to agree in giving evidence, or proof.
 CRANIUM, the skull.
 CREST, the back or upper part of the neck.
 CRITERION, a rule to judge by.
 CRUST, the hoof is so called.
 CULTIVATE to improve the form, size, or intellect.

D

DEBILITY, weakness; feebleness.
 DECREASE, to make less.
 DECOMPOSE, to decay; to separate into its component parts.
 DEDUCE, to form an idea or conclusion.
 DEFECTIVE, not perfect.
 DENSE, close; solid; hard.
 DELIRIUM, craziness; want of sense.
 DETERIORATION, to make less or worse.
 DEVELOP, to show muscular form; to bring up to perfection.
 DIAPHORETICS, medicines which arouse sweating.
 DIAPHRAGM, the broad muscle which separates the chest and belly, and assists in the act of breathing.
 DIFFUSE, to spread out; extend; drive out.
 DIGESTIVE, relating to digestion.
 DILATED, opened wide; gaping open.
 DILUTE, to make fluid medicine thin or weak, as with water, etc.
 DIMINUTION, lessening, or decreasing.
 DISLOCATION, putting out of joint.
 DISSENT, to differ from.
 DISTORTED, crooked or deformed; out of shape.
 DISTENDED, stretched out; forced out, or swelled.

DIURETICS, medicines which increase the flow of urine.
 DIVERT, to turn aside from.
 DOCILE, gentle; tame; obedient.
 DOMESTICATION, taming or bringing from a state of nature.
 DOMINION, control; authority; power.
 DUCTS, pipes or openings; canals; tubes.
 DUODENUM, the first gut next the stomach; the bile enters through it.

E

ECONOMY, saving; good management.
 EFFUSION, the flowing out of a fluid.
 ELASTIC, springy, as a spring or India-rubber.
 ELUDE, to escape observation; to shun.
 EMBRYO, the unborn animal.
 ENAMEL, the hard covering of the teeth.
 ENSUE, to follow.
 EPIDEMIC, a disease affecting many, as if it existed in the air.
 EPIGLOTTIS, the covering of the glottis.
 ERECT, standing up straight.
 ERUPTION, a breaking out on the skin of pimples or blisters.
 EWE-NECKED, low-necked, like a shorn sheep.
 EXALTED, dignified; raised.
 EXANTHEMA, an eruption on the skin, with fever.
 EXCRETING, throwing out from the body.
 EXCREMENT, the dung, and urine.
 EXERT, to act diligently, promptly.
 EXHALE, throwing, or forcing out, as blowing the breath.
 EXHAUSTION, being tired, or worn out by fatigue.
 EXHILARATE, to make lively, or cheerful.
 EXIST, to live, to be.
 EXPANSION, increasing in size.
 EXPEDITE, to hasten.
 EXPEL, to throw out, or drive out.
 EXTERNAL, on the outside.
 EXTENSOR TENDON, tendon that extends, or stretches out the limbs, etc.
 EXTERIOR, the outside.
 EXTRAVASATE, to flow out of the proper vessels.

EXTREMITY, the limbs are so called.
EXUDE, to soak out through.

F

FACILITY, an ease; easiness.
FALLACY, an error; not true; deceit.
FEBRIFUGES, medicines which cool fevers.
FEMUR, the thigh-bone proper.
FIBULA, the smallest of the two bones above the hock.
FIBROUS, composed of fibers, or fine, thread-like substances.
FIBROUS MEMBRANE, a membrane composed of fibers.
FISSURE, an opening, or crack.
FLATULENT, windy; relating to gas, or wind in the stomach, etc.
FLEX, to bend, or gather up.
FLUID, a liquid; such as water; air is so called.
FLORID, red, or scarlet-like.
FOMENTATION, applying warmth and moisture by poultices, etc.
FORCEPS, long, pointed pincers, or nippers.
FRACTURE, the breaking of a bone.
FRICTION, rubbing.
FUNCTION, the office or duty of any thing.
FUNDAMENT, the anus, or last end of the guts.

G

GANGRENE, mortification.
GENERATIVE, concerned in producing, or begetting, or breeding.
GENERATE, to produce; to beget offspring, or young.
GENITAL, belonging to the organs of breeding or generation.
GLAND, a soft body, with a tube leading from it, which secretes fluid.
GRANULATE, to form new flesh, or matter, which has the appearance of small grains.
GROOVE, a channel, or gutter.
GROUP, a collection, or several together.
GULLET, the esophagus or passage to the stomach.

H

HABIT, custom, or practice.
HAGGARD, worn down; ghastly; deathlike.
HAUNCH, the bony region of the hips.
HECTIC, constitutional fever, produced by ulcers or sores, etc.
HEREDITARY, bred in the offspring from the parents, as disease, color, etc.
HUE, a color.
HUMERUS, the upper arm-bone.
HYSTERIC, a nervous disease of females.

I

IMAGINATION, what the mind dictates, or suggests.
IMPEDIMENT, an obstruction; hinderance; fault; an eye-sore.
IMPEDE, to hinder.
IMPERCEPTIBLE, not noticeable.
IMPLICIT, a perfect faith.
IMPRESSION, an idea, or conclusion; a mark.
IMPULSE, a disposition.
IMPURITY, unfitness for use; adulterated
INADEQUATE, not sufficient.
INNATE, inherent in itself.
INCISOR; the front or cutting teeth are called incisors.
INCISION, a clean cut.
INCUKATED, taught; instructed.
INDURATED, hardened.
INFECTION, the poison which causes the same disease by coming in contact with a healthy animal; inoculation.
INFERIOR, the under side; a bad quality.
INOCULATION, producing the same disease by virus of one animal getting to a sore on another, or in any way getting into the blood.
INSERTION, when any thing is put into another by cutting, etc.
INSTINCT, brute sense; void of reason.
INTERNALLY, inwardly; medicines given by the mouth are said to be given internally.
INTENSITY, in an extreme degree.
INTERVALS, space of time, as between spasms or fits.

INTESTINES, the bowels; the guts.
INTERFERING, cutting one foot with another in passing it.
INJECT, to throw into; also to cause disease by injection.
INVERT, to turn round, or upside down.
INVIGORATING, strengthening.

J

JETS or **SPURTS**, a name given to the bleeding of arteries.
JUGULAR, the large neck vein. (See "Anatomy.")

L

LACERATE, to tear; to drag asunder.
LAMELLÆ, small plates. (See "Anatomy of the Foot.")
LANGUOR, weakness; faintness.
LATERAL, to the one side.
LENS, a part of the eye.
LEVER, any thing stiff used to raise weights at one end, with a force applied to the other.
LIGAMENTS, strong bands about the joints.
LOCAL, near; in a certain place.
LUBRICATE, to moisten; to oil, such as the joints are by the joint-oil.
LUCRATIVE, profitable.
LUNAR, relating to the moon.
LYMPHATIC, vessels containing lymph. (See article on the "Lymphatics.")

M

MACERATE, to soak in fluid, such as water, etc., before dissecting.
MALADY; a disease or ailment is so called.
MALFORMATION, an unnatural shape of structure.
MALIGNANT, severe; low; dangerous.
MASTICATE, to chew; the act of chewing.
MATERIA MEDICA, medical materials.
MATERIALLY, importantly; that which concerns.
MATURE, full grown; ripe.
MEDIUM, midway; middle-sized; the center of the whole.
MEDULLARY, the marrow of the bone

MEMBRANE, a thin covering; one covers the brain, others the bones and different organs.
MENTAL, relating to the mind.
MIASMA, poison in the air, causing disease.
MIGRATORY, changing from place to place.
MODERN, new; of late date.
MORAL, discreet; just and peaceably minded.
MORBID, unhealthy; there are morbid sores, secretions, etc.
MORTIFICATION, the death of any part of the animal diseased by sore or wound, called gangrene.
MUCILAGE, a jelly-like fluid.
MUCUS, the secretion of the nose, and all mucus surfaces of the animal.
MUSCLES, the fleshy portion of the animal.
MYSTERIOUS, hard to understand.

N

NAUSEATE, to sicken the stomach.
NAUSEANTS, medicines that nauseate.
NARCOTICS, medicines which stupefy or cause sleep.
NERVOUS, relating to the nerves; weak-nerved animals are called nervous.
NEUTRALIZE, to destroy the force or effect.
NITRATE or **SILVER**, lunar caustic.
NUTRITIVE; strong, healthy food is so called.

O

OBEDIENCE, submission; tameness.
OBLIQUE, slanting; crooked.
OBVIATE, remedied; avoided.
OBVIOUS, clear; plain; certain.
OPTIC, relating to the eye or sight.
OPPROBRIUM, reproach.
ORGANIC, composed of organs.
ORGANISM, the living body.
ORGANIZED, composed of organs; complete.
ORIGIN, the first existence, or beginning.
OSSIFICATION, turning into bone.
OS, the technical name of bone.
OS CALSIS, the tip of the hock.
OVAL, round; egg-shaped.
OXYDATION, converting into air (oxyd); the process performed on the blood in the lungs by contact with the air.

OXYGEN, the element in the air which principally sustains life.

P

PALATE, the upper part or roof of the mouth.

PALATABLE, pleasant to the taste.

PANCREAS, the sweet-bread.

PERCEPTIBLE, that may be seen or known.

PERFORATED, full of small holes.

PERIOSTEUM, the membranous covering of the bones.

PERMANENTLY, continuing a long time; in a fixed state or place.

PERPENDICULAR, straight up and down.

PERPETUATE, to continue.

PERVERT, to change, or turn from its former uses.

PERNICIOUS, evil; bad.

PHARYNX, the opening into the gullet or passage to the stomach.

PHENOMENON, an unusual appearance.

PHYSICAL, ability or strength of the natural body.

PLACENTA, the membrane covering the foal in the womb.

PLANTAR, belonging to the feet.

PLETHORA, full of blood; a full habit.

PLEURA, the serous membrane that lines the chest and contents and reflects on the same, lubricating or oiling them with its secretions.

POSTERIOR, the hinder end.

PREDISPOSE, to fit for; to give an inclination to.

PREGNANCY, the act of being with young.

PREVALENT, existing plentifully; often occurring.

PROCESS, long spikes or points of bones.

PROFUSE, plentiful; of great abundance.

PROGENY, the offspring of any ancestors.

PROMINENCE, an elevation of a part.

PROPAGATE, to plant; to produce offspring.

PROTRACTED, continued a long time.

PULMONARY, belonging to the lungs.

PULSE, the beat of the arteries.

PUMICED, the falling down of the coffin-bone on the sole. Caused by inflammation.

PUNCTURE, to make a hole with a pointed instrument.

PUPIL, the apple or ball of the eye.

PUTREFACTION, corruption; rottenness; decomposition, etc.

Q

QUITTOR, an ulcer inside the foot, of the character of fistula.

R

RADIUS, the large bone of the lower arm above the knee.

RADIATED, like the rays of the sun.

RANCID, a rank, strong, sour smell.

RECENT, lately; not long since.

RECOGNIZE, to know a former acquaintance.

RECTUM, the last gut.

REPRODUCTION, the act of breeding.

RESPIRATION, the act of breathing.

RESPONSE, an answer to a query or requirement.

RETENTION, stoppage or holding; the urine is so held.

S

SALIVARY, the glands that throw out the saliva or spittle.

SALIVATE, to cause an increased flow of saliva or spittle.

SALIVA, a spittle.

SAPHENA MAJOR AND MINOR, veins of the hind-leg.

SCALLOPED, hollowed out; the edges of a circle cut in segments.

SCAPHOID, shaped like a boat.

SEAR, to burn with a hot iron (cautery).

SECRETION, hiding; throwing off fluid, joint-oil, spittle, etc.

SEMICIRCLE, a half circle.

SENSITIVE, having feeling; also wit.

SENSITIVE LAMELLÆ, the lamellæ of the coffin-bone.

SENSIBILITIES, feelings of impressions, hurts, or shocks, etc.

SEPTIC, poison in dead bodies. Called *virus* in the living.

SINUSES, small holes containing matter or pus.

SKEPTICAL, doubtful; not believing.
SLOUGHING, rotting or mattering away.
SOCKET, a depression or hole for an organ to work in.
SPASMODIC, relating to cramps, fits and spasms.
SPECIOUS, pleasant to the view.
SPECIES, the same class of animals, plants, etc.
SPONTANEOUS, a plentiful growth; not planted.
STRANGURY, stopping; choking any passage; holding tight.
STRICTURE, stoppage, or tightening of any of the passages of the body by morbid or spasmodic action.
STRUCTURE, the formation of any thing.
STUPOR, dullness; sleepiness; senselessness.
STERNUM, the breast-bone.
STYPTICS, articles in medicine which stop bleeding.
SUBSEQUENT, since a certain period of time.
SUBSIDE, to sink; go down quick; quit swelling.
SUBTILE, crafty; tricky.
SUPERFICIAL, the upper or outside view.
SUPERIORITY, exceeding another in any way.
SUPPURATION, mattering.
SUSCEPTIBLE, easily influenced; capable of receiving.
SUSTENANCE, food; support; keeping.
SUTURES, stitches; fastenings; joinings.
SYMMETRY, well built; stout; well proportioned.
SYMPATHY, affection; a nervous connection between different parts of the same body.

T

TEMPORARY, only for a time.
TENDON, the small end of a muscle near a joint; the back sinews of the leg, etc.
TENT, a plug tent or pledget.
TESTICLES, the stones of the stallion.
THORAX, the chest.
TIBIA, a bone of the hind-leg above the hock; thigh-bone.

TONICS, medicines that add strength and vigor.
TRANSMITTED, passed from one to another, as from parent to offspring.
TRANSPARENT, clear; that can be seen through.
TRAPEZIUM, one of the bones of the knee.
TREAD, to tramp on; the part of the hoof that rests on the ground.
TUBERCLE, a small tumor; a forerunner of consumption.
TUMEFACTION, a puffy swelling of any part.
TUMOR, a swelling or enlargement.
TURBINATED, having a round crown or top.
TURRET, a tower; the rings of a harness through which the lines pass.

U

ULCERS, running sores.
ULNA, a bone of the arm.
ULTERIOR, beyond any line or division; a last result.
UNCIFORM, shaped like a finger-nail.
URETER, the tube conveying the water from the kidneys to the bladder.
UTERUS, the womb.

V

VACANTLY, thoughtlessly; foolishly.
VASCULAR, highly organized, or furnished with blood-vessels.
VENTILATE, to supply with pure air.
VERMIFUGES, medicines that destroy worms.
VILLI, small, fine fibers, like hairs.
VIRUS, poisonous; contagious, or infecting matter.
VISION, the sight; the art of seeing.
VITAL, having or containing life.
VIVIFYING, bringing to life.

W

WITHERS, the high process of the vertebrae between the neck and the back.

Z

ZOOLOGIST, one who examines and describes animals.

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